...ROLOGY DEPT.

...voted to
...EXTILE
...EMISTRY
...EACHING
...YEING
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...NISHING

...EMBER 22, 1943
...ME 32, No. 24

DEC 7 1943

...CIAL PUBLICATION
of the
PROCEEDINGS
...ICAN ASSOCIATION
...EXTILE CHEMISTS
...ND COLORISTS

AMERICAN

DYESTUFF REPORTER

Annual Processing Review Number

You'll be happier . . .

as you get back into civilian production of woolens and worsteds, to use Polar Colors. There are fewer problems because of processing fastness; the goods sell better because of their unusual brightness; and the consumer becomes a friend because of the wearability and durability of the color.

You can't help being happier selling a fabric dyed with Polar Colors — and a little proud, too.

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Dyestuff Makers Since 1859

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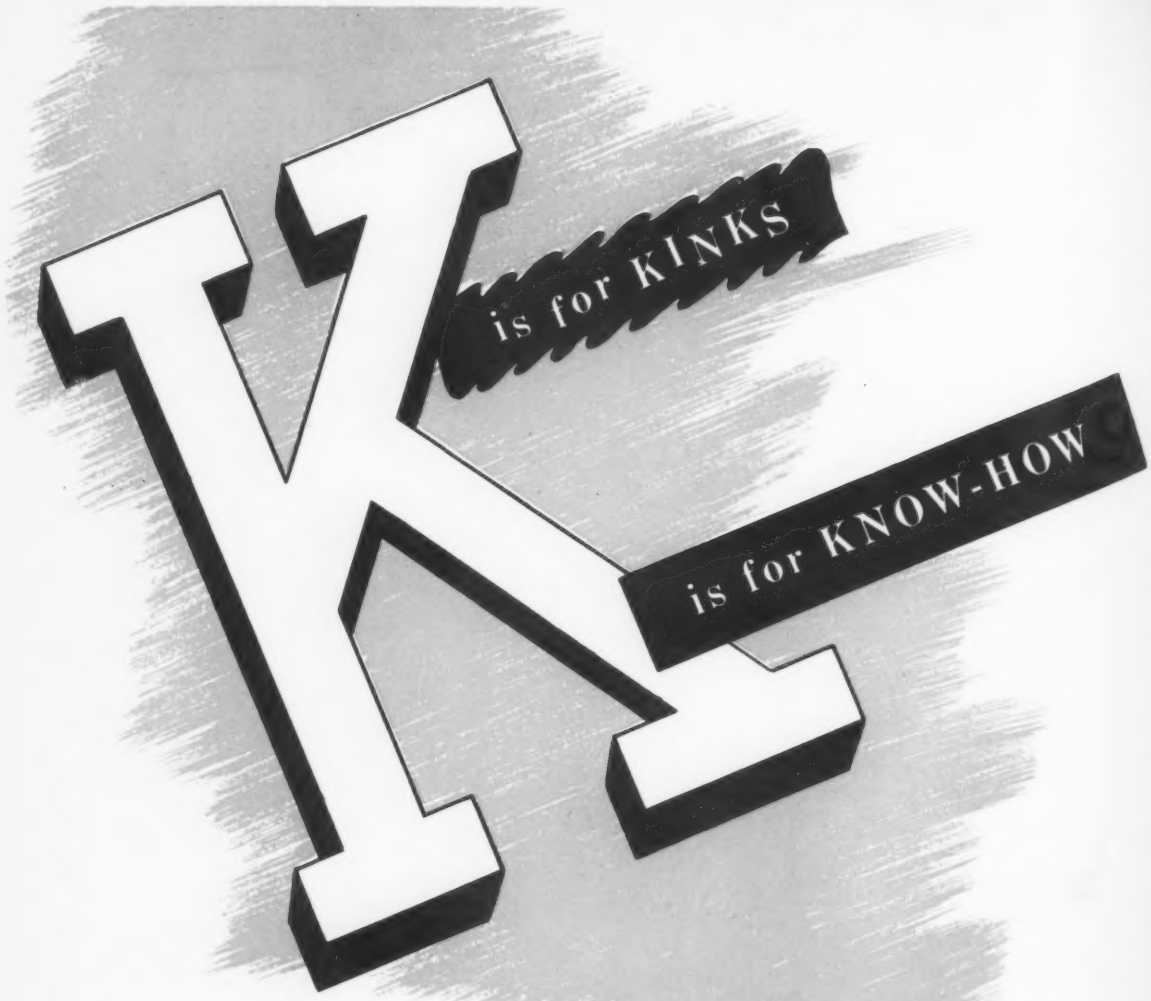

Ironing out the wrinkles in the chemicals supply situation continues to be a difficult job for the processor of civilian goods.

Ways-and-means, however, to smooth out many such production problems are available through the use of alternate non-priority materials. What these materials are... how they can best be utilized ...are part of the wartime information service that Cyanamid has undertaken with civilian goods industries specifically in mind.

Whatever your present difficulties may be growing out of the chemical shortage situation... consult with Cyanamid. Here we are prepared to work with you in the solution of your problems making recommendations that may not only "stop-gap" current needs but which may serve to open new opportunities for postwar processing developments.

AMERICAN CYANAMID
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AND OTHER SPECIALTIES FOR THE TEXTILE INDUSTRY
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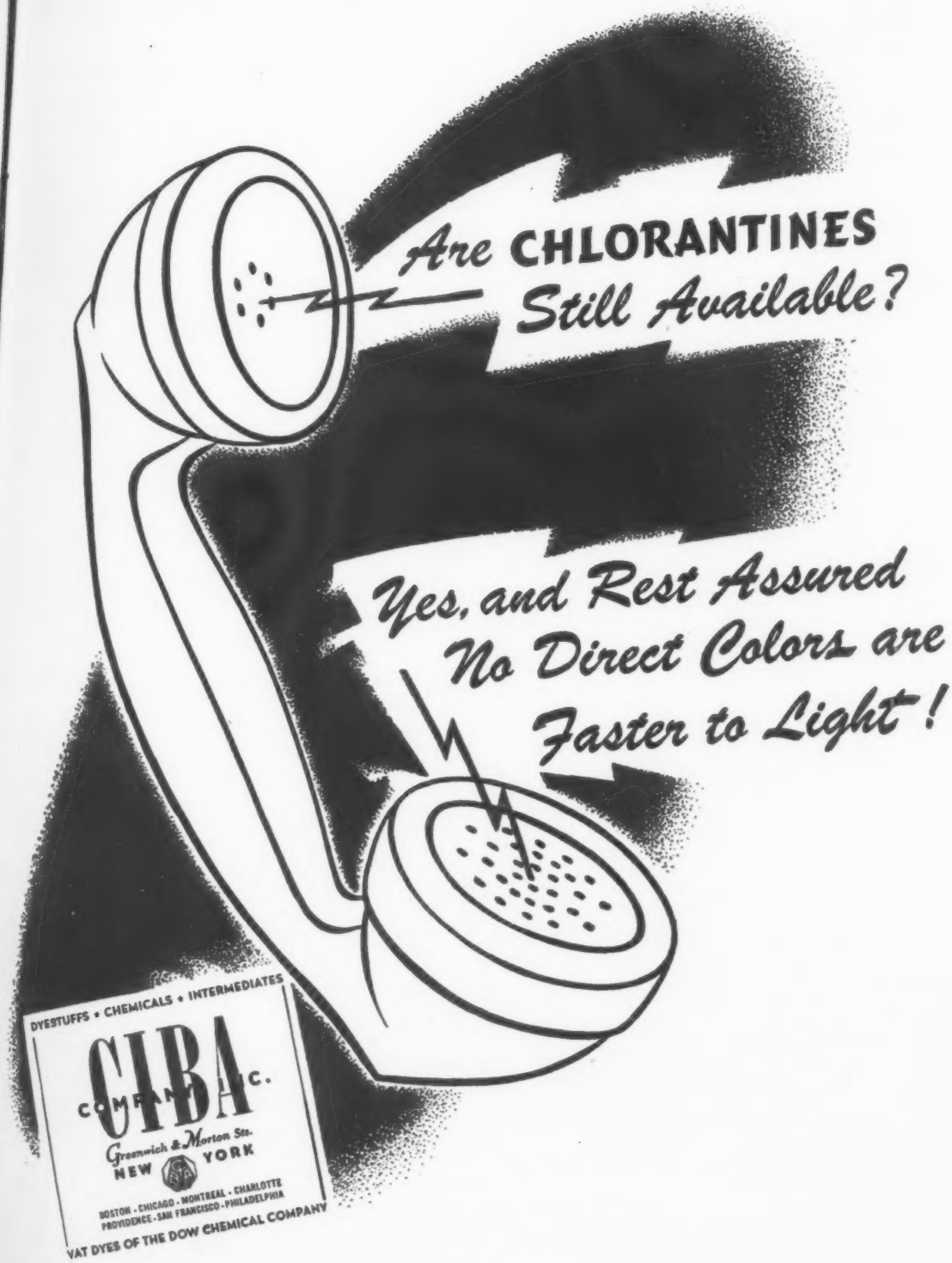
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Great step forward in the battle against Mildew and Wet Weather

Here is how Fen is meeting today's responsibilities and tomorrow's challenge in the fight against mildew and wet weather.

See the new home of Fen—planned to give you better service than ever before. It's a finer, larger plant equipped with an up-to-date research and production laboratory, manned by experienced textile chemists whose services are yours to command.

Fen for war orders comes first. Thousands upon thousands of yards of military fabrics are being treated with Fen Water Repellent, Fen Anti-Mildew and Fen-Aseptic, a combination of both.

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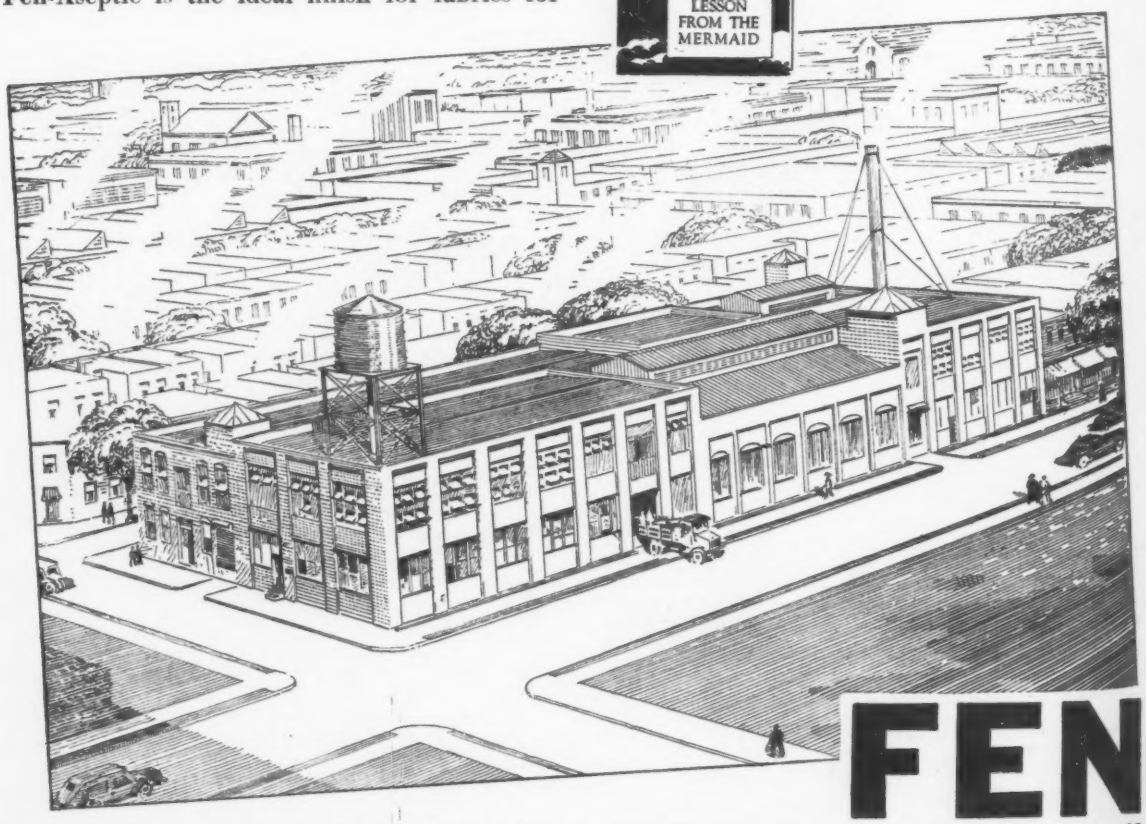
With our increased production facilities, we are able to meet some of your requirements on civilian goods. Let us serve you now.

When fabrics call for water repellency, alone, depend on Fen Water Repellent. Proof of superior results is given in folder, "Take a Lesson from the Mermaid." Write for a copy.



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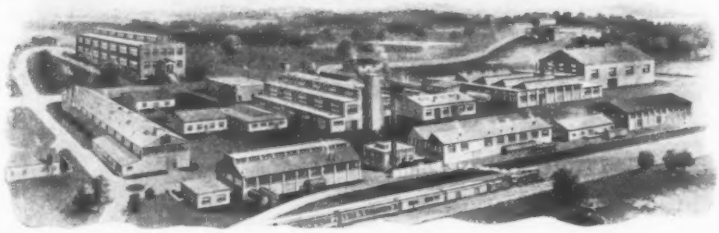

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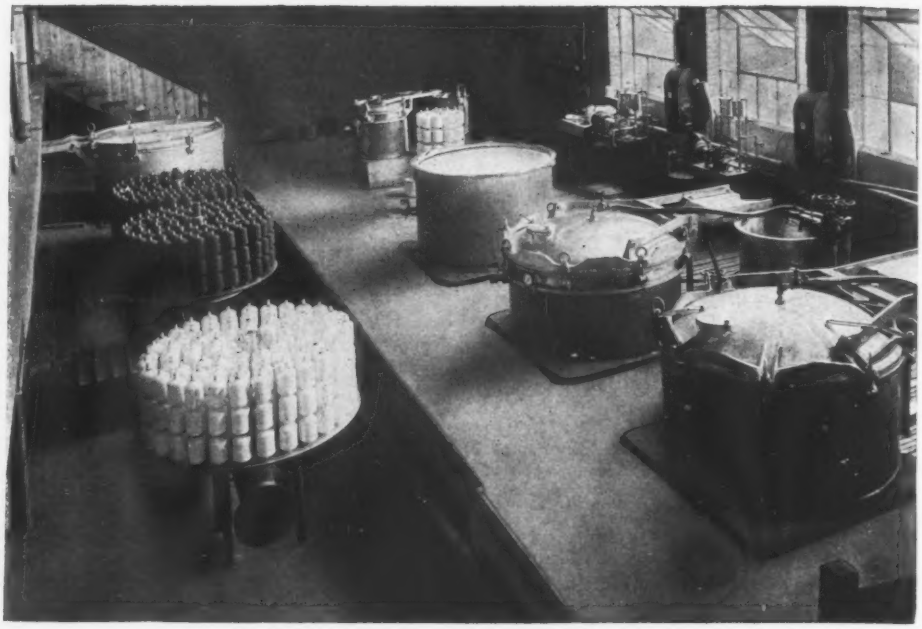

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A compound which fixes direct colors on cottons and rayons and also acts as a softener. Applied in the last rinse, it greatly reduces the bleeding and crocking of direct colors.

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It is an alkyl aryl sulphonate type of wetting agent active at low and high temperatures. It is used for the wetting and dispersing of vat dyestuffs and makes a valuable addition to wool fulling baths.

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An improved permanent Cation Active Finish—Imparts a heavy, smooth softness and mellow hand to all types of fabrics.

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PERMA TERGE

A highly efficient scouring compound for use on all types of spun rayon, rayon sheers, rayon crepes, pigment and bright yarn, crepes, taffetas, nylon, Aralac-wool mixture, and Aralac-spun rayon mixtures. Scouring with PERMA TERGE softens the fibre. This compound is especially recommended for jig work.

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Compounds for imparting bacteriastatic, fungistatic and mildew resistant finishes to textiles, paper and leather. Special PERMA-CIDES (A-5, AL-10, OS, E and E1) make it possible to apply these finishes from aqueous, hydrocarbon or other solvent solutions. They are compatible with water repellents, cellulose solutions, paints, and other coating compounds. The water soluble PERMA-CIDES make excellent preservatives and mold inhibitors for both carbohydrate and protein sizing solutions.

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A superior two-purpose "boil-off" compound and softener. Tends to soften fibres besides "boiling-off" and serves as a prefinish. Used also as an addition to the dyebath for better penetration and dispersion, thereby giving increased dye solubility and color value. It has been found to be an excellent kier assistant, in place of the usual soaps, solvents, etc.

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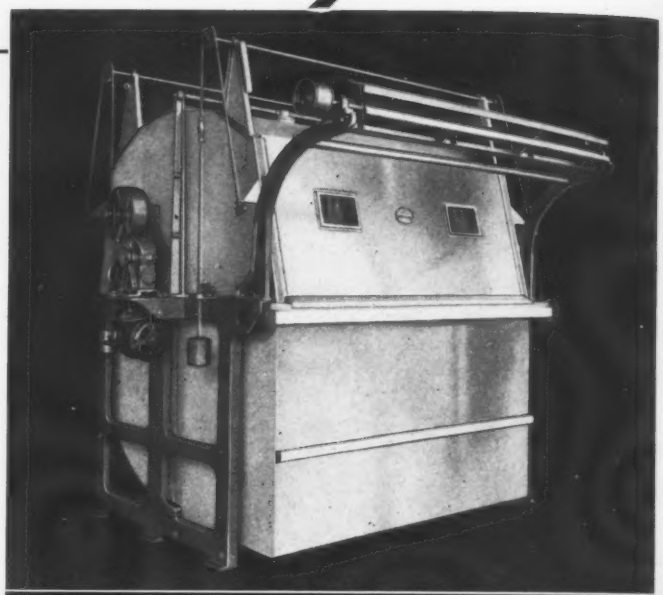

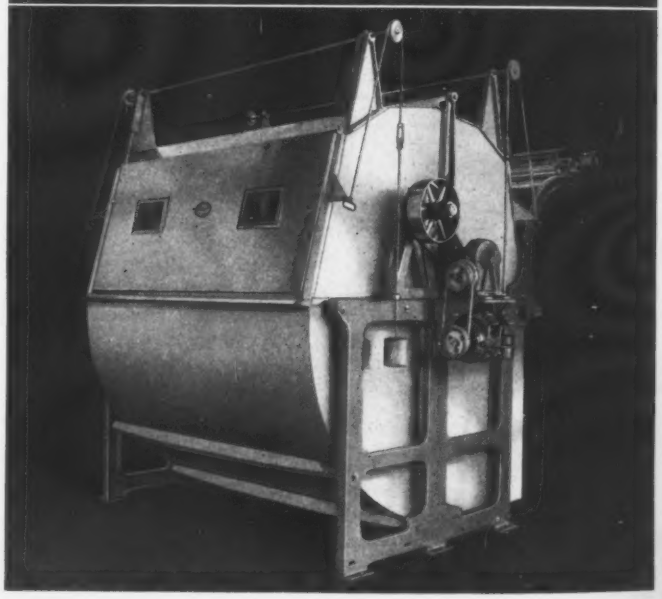

ILLUSTRATED here is the newest Hunter addition to modern dyeing and bleaching requirements. It offers the users these distinct advantages among others:

(a) Vibrationless construction: All driving and driven members supported in newly designed separate frames.

(b) Vari-speed drive for main reel for increased flexibility.

(c) A size and type for any piece dyeing or bleaching requirement.

(d) Tight top enclosure, which is windowed and lighted, saves up to 35% of steam for the dyeing cycle. Entire Kettle may be insulated if required.

(e) Proved performance on fabrics ranging from mohair plushes, woolens, worsteds, unions, blankets, to spun rayon suitings.

If you contemplate replacing or expanding your present dyehouse units, it will pay you to ask Hunter for details. Simply write or call

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Laurel Emulsions give more even cotton yarns, clearer stitch and proper regain.

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Great demands have been made on the American Chemical and Dyestuff Industry to help in the war effort. We are proud of our organization and every employee in it for answering the call to the colors so splendidly. We are serving America and the fighting forces now, and the progress we make today will help build a better world for tomorrow, after the peace is won.

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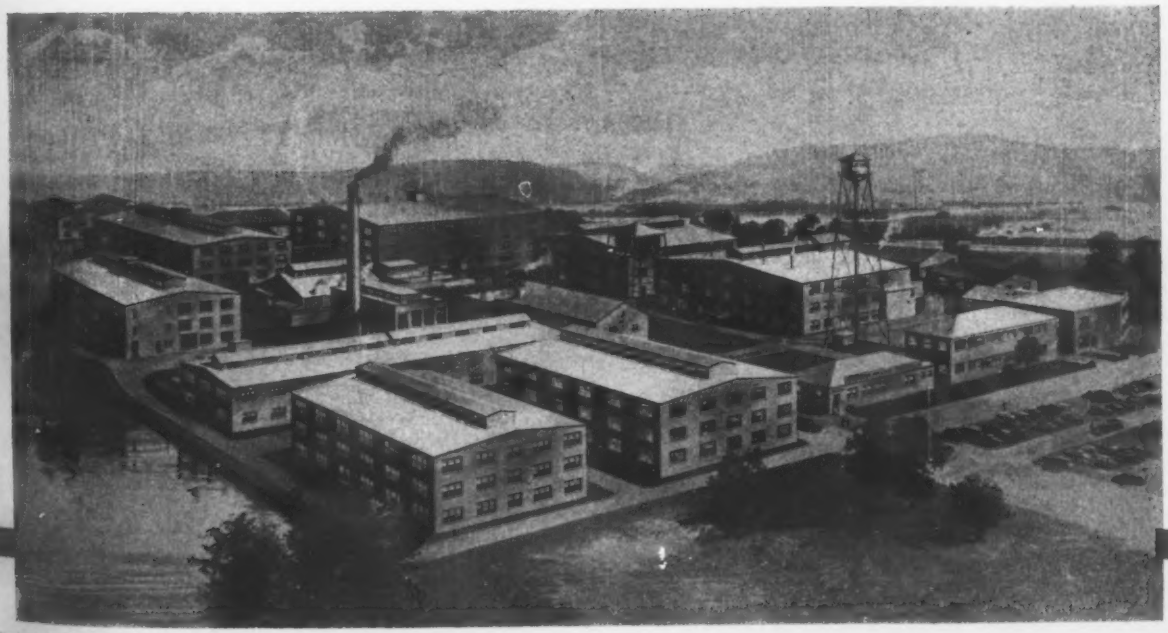

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In the production of service fabrics many difficult problems are being solved by our experienced laboratory technicians.
This technical staff composed of men of long experience in peace time research and practical plant operation, is available to you in solving your problems encountered in the production of fabrics for war.

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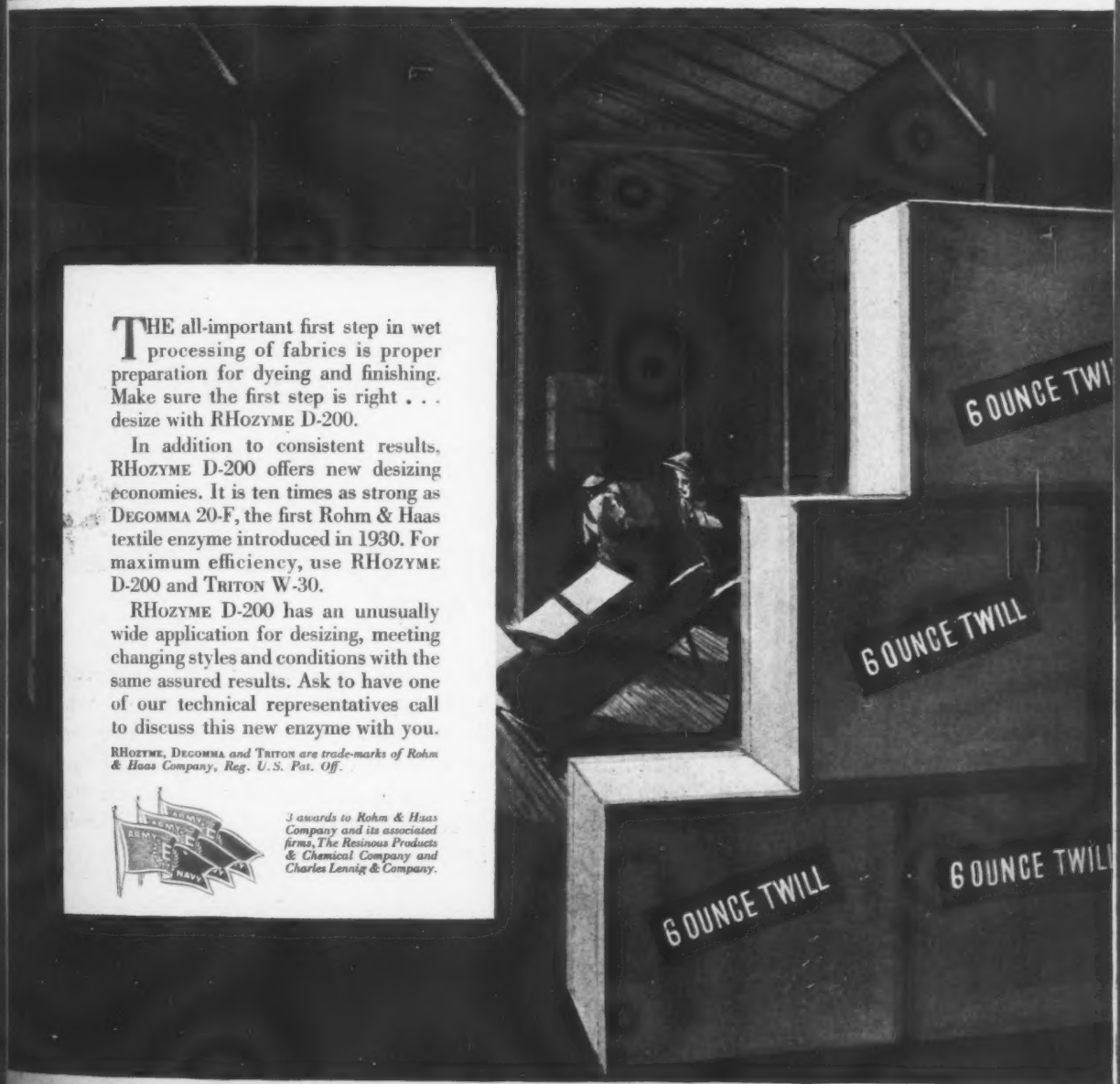
In dyeing and finishing...it pays to take the all-important first step with

RHOZYME D-200



THE all-important first step in wet processing of fabrics is proper preparation for dyeing and finishing. Make sure the first step is right . . . desize with RHOZYME D-200.

In addition to consistent results, RHOZYME D-200 offers new desizing economies. It is ten times as strong as DEGOMMA 20-F, the first Rohm & Haas textile enzyme introduced in 1930. For maximum efficiency, use RHOZYME D-200 and TRITON W-30.

RHOZYME D-200 has an unusually wide application for desizing, meeting changing styles and conditions with the same assured results. Ask to have one of our technical representatives call to discuss this new enzyme with you.

RHOZYME, DEGOMMA *and* TRITON *are trade-marks of Rohm & Haas Company, Reg. U.S. Pat. Off.*

3 awards to Rohm & Haas Company and its associated firms, The Resinous Products & Chemical Company and Charles Lennig & Company.

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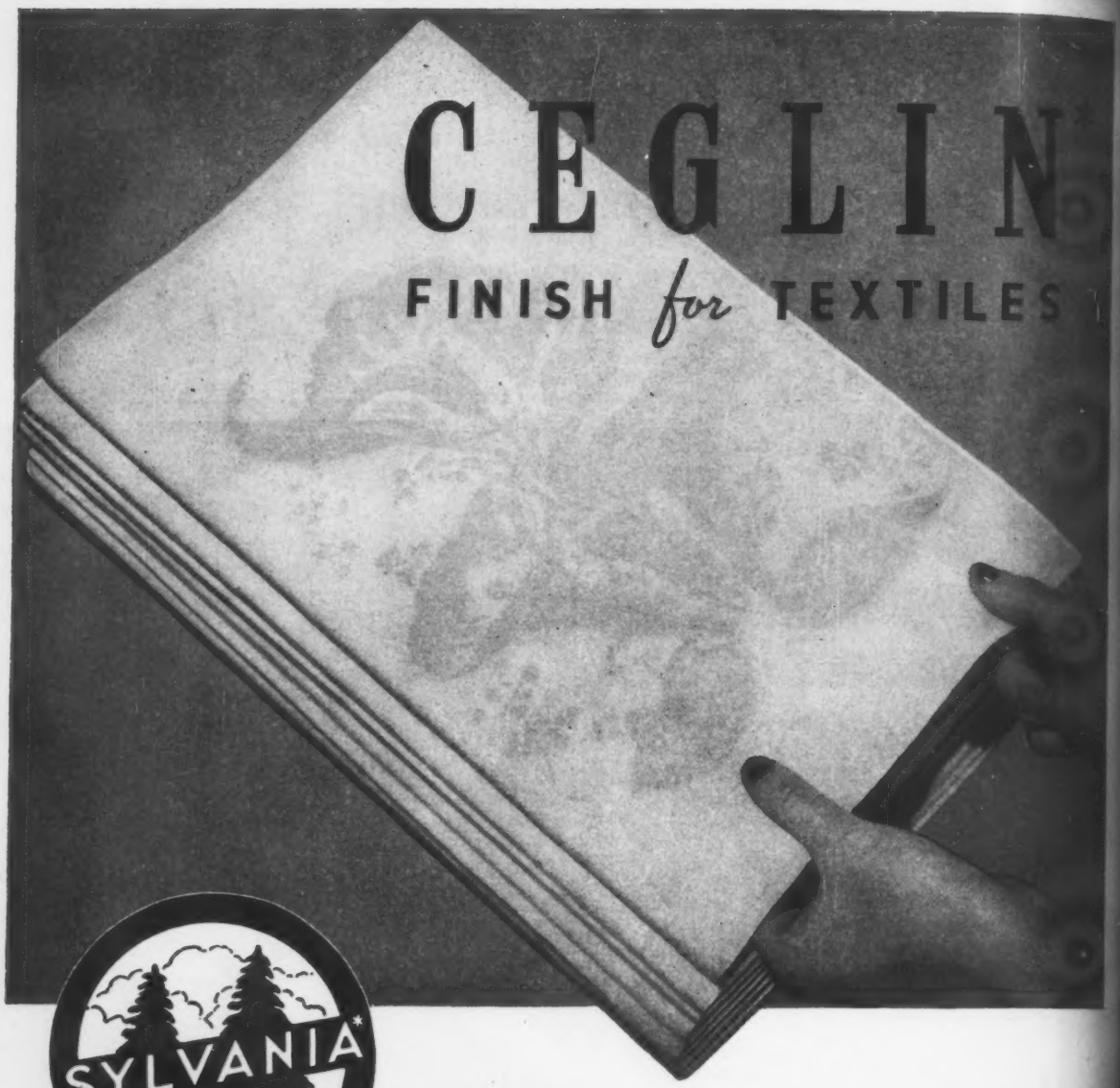
Manufacturers of Chemicals including Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes . . . Chemicals for the Leather, Textile and other Industries



When applied to cotton damasks, one can see, feel, and through longer service, appreciate the advantages of this Ceglin* finish. Ceglin produces a lint-free, smooth, lustrous and linen-like surface which is retained after repeated laundering. Institutions and service organizations will find the use of Ceglinized damask economical in that the saving in starch during its serviceable life will pay for the article.

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MILDEW AND BACTERIA RESISTANT FINISH

Lasting mildew and bacteria-resistant finish. Recommended for fabrics which must meet bacteriostatic and fungistatic properties as specified by U. S. Government. Free of objectionable odors, non-toxic. Manufactured by Gallowhur & Co., Inc.

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Aqua-Sec water-repellent plus Puratized mildew-resistant. Compounded so that approximately a 6% solution, based on 100% pick-up, will give a repellency rating of 90 or better, and will deposit .5% of Puratize on the fabric.

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FINISH FOR TEXTILES

A durable cellulose finish...now adding strength and durability to mosquito nettings, shirtings, sheetings, and lace fabrics. Becomes so firmly anchored to each thread that it is fast even to kier boiling. Manufactured by Sylvania Industrial Corp.

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SOLVES THE MILDEW AND BACTERIA PROBLEM

in Military Fabrics

MILLIONS OF YARDS of military textiles have been . . . and are being . . . conditioned against the destructive action of mildew and bacteria and made antiseptic by PURATIZED*—the lasting mildew- and bacteria-resistant finish.

So great is the demand for PURATIZED formulations by manufacturers with war contracts that PURATIZED may not, at this time, be supplied in any great quantity for the finishing of civilian materials. In treating mosquito netting, jungle hammock covers, ground cloth, duck, pneumatic float and boat materials, and a long list of other supplies for the Army, Navy, Marine Corps, Coast Guard, and Maritime Commission, war contractors have found PURATIZED a practical finish that meets the severe Government specifications for mildew and bacteria resistance in military textiles.

When all war orders are filled, PURATIZED will be available, in abundant quantities. Then textile products of every kind—domestics, napery, draperies, towelings, carpetings, dress goods, and countless PURATIZED articles—will offer the textile industry a sensational postwar merchandising opportunity. For all these textile items, when PURATIZED, become lastingly bacteriostatic, fungistatic, mildew-resistant . . . hence longer lasting and more serviceable.

Other industries, such as paint, paper, leather, plastics, rubber . . . already using PURATIZED to finish important war goods . . . will benefit when we have won this war and peace comes again, from the laboratory-tested and war-proved qualities that PURATIZED gives to their consumer goods. We regret that vital war duties make it impossible to fill sizable orders for civilian consumer goods at present. However, limited quantities of PURATIZED formulations are available to textile manfacturers for research purposes.

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GALLOWHUR & COMPANY, INC.

250 E. 43rd Street, New York 17, N. Y.

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The Facts

ON EXCLUSIVE OR SPECIALIZED *HOOKER* DYESTUFF CHEMICALS

You may find the answer to one of your problems in this list. Some are exclusive Hooker products—the result of devoting a considerable amount of research against a background of knowledge of the dyestuff chemical field. The others are important dyestuffs on which Hooker has specialized—and by so doing brought them to Hooker standards of quality. All are thoroughly tested products of the highest quality.

This is not a complete list of Hooker dyestuff chemicals—Hooker currently makes 39 others—and can make many more.

Samples of these chemicals are available for laboratory investigation.

Acetyl Chloride, CH_3COCl, is a highly active chemical which can be used to introduce the acetyl group into organic compounds, especially through Friedel-Crafts reactions. A clear, colorless liquid; molecular weight 78.5; boiling point, 50.9° C.; specific gravity, 1.1051, 20°/4° C.; reacts with water and alcohol; soluble in ether.

Antimony Trichloride, Anhydrous, $SbCl_3$, is a white solid with a slight yellow tinge, used as a catalyst in the manufacture of dyes. Its molecular weight is 228.1; melting point 73.4° C.; solubility gms/100 gms: water—601.6 at 0° C., benzene—30.5 at 20° C., monochlorbenzene 56 at 20° C.

Benzoic Anhydride, $(C_6H_5CO)_2O$, is used as a reagent to introduce the benzoyl group in the manufacture of dyes. It is a light yellow crystalline solid with a molecular weight of 226.1; melting point, 42° C.; boiling point 360° C.; insoluble in water; soluble in alcohol and ether.

Meta Nitrobenzoyl Chloride, $C_6H_4NO_2COCl$, is a mixture of isomers, mostly meta. A yellow crystalline solid with a molecular weight of 185.5, with a melting point of at least 31° C.; boiling point, 275-278° C.; reacts with water and alcohol; soluble in ether.

Para Nitrobenzoyl Chloride, $C_6H_4NO_2COCl$, is a yellow crystalline solid, with a melting point of at least 70° C. Its molecular weight is 185.5; boiling point 202 to 205 at 105 mm.; reacts with water and alcohol; soluble in ether.

Phosgene, $COCl_2$, is a clear, yellow liquid at temperatures below 8° C., and a colorless gas at higher temperatures; specific gravity of liquid 1.392 at 19°/4° C., molecular weight 98.9. It reacts with organic acids to give acid chlorides and anhydrides; with alcohols to give dialkyl and chloralkyl esters of carbonic acid; with sodium salts of phenols to give diaryl esters of carbonic acid.

Sodium Sulfhydrate, NaSH, is a light yellow colored solid in flake form, containing 70 to 72% total NaSH, no Na_2S or NaOH, less than 1% NaCl, less than 1% Na_2SO_3 and $NaHCO_3$, less than 5 ppm Fe, less than 1 ppm Cu, Ni, Cr, Mn, Pb; remainder is water of crystallization; it melts at about 55° C. giving a clear yellow solution. Molecular weight, 56.1; soluble in water and alcohol.

Sulfuryl Chloride, SO_2Cl_2, reacts with organic acids to form acid chlorides and anhydrides. Hooker Sulfuryl Chloride *High Grade* is practically colorless, has a boiling range of 2° including 69.1° C., and is at least 99% pure Sulfuryl Chloride. Hooker Sulfuryl Chloride *Technical* is light yellow in color; it is not distilled. Molecular weight, 135.0; freezing point, minus 54.1° C.; reacts with water; soluble in benzene and acetic acid.

Thionyl Chloride, $SOCl_2$, is used in organic synthesis to replace various groups with chlorine and especially to make organic acid chlorides and anhydrides. Hooker Thionyl Chloride is a colorless to yellow-green liquid. Molecular weight, 119; freezing point, minus 104.5° C.; boiling point, 78° C.; it reacts with water and alcohol.

Keep on Buying More WAR BONDS!

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4914

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MONTREAL TORONTO

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The South Sea native asks . . . in Pidgin English . . . "Why do your uniforms look like the jungle?"

Jungle uniforms worn by our boys mask their visibility against the tropical background and protect them from such hazards as malarial mosquitoes, poisonous thorn scratches . . . and just Japs.

We are proud that Stein-Hall sizing, finishing and printing materials are helping the Textile Industry to supply uniforms which make our fighting forces the best and most safely dressed in the world.

In spite of heavy war demands on our manpower, supplies and facilities, we shall strive faithfully to render you the same high degree of service as customary in peace times. If we fall short occasionally, we ask your indulgence.

And don't forget . . . *"Bayim mor taitim bonds!"* You can translate that one yourself.

* * *

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To The A. A. T. C. C.

Our congratulations on this the Twenty-Third Anniversary of uninterrupted service in the advancement of the science of Textile Wet-Processing.

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EACH CHARACTERIZED BY DISTINCT INDIVIDUALITY IN ITS PARTICULAR FIELD OF APPLICATION

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INCORPORATED

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2701 Boston St., Baltimore, Md.

PATERSON OFFICE
50 E. 13th Street

Department of Tomorrow

All over this land men are peering into beakers for a glimpse of things to come. Not necessarily post-war products; they may be seeking replacements for materials that have gone to war. They strive to do better with less, and they succeed.

American ingenuity has triumphed over war shortages in many fields, including textile processing. People wear clothes in war or peace. They must be kept warm; they insist on style and quality.

This challenge to the textile chemist has met with surprising results. What seemed impossible has proved entirely practicable.

This scene in The Houghton Textile Laboratory is typical of many such searches for better processing products for all branches of the textile industry.

If you seek a rayon oil, or a detergent, or wetting agent, or cotton warp size, or wool conditioning oil—you will want to know what Houghton, with its recently augmented research facilities, has to offer. We invite inquiries for both the things to come, and those which, insofar as research is concerned, have already arrived, ready for your use.

E. F. HOUGHTON & CO., Philadelphia and Charlotte

303 West Lehigh Ave., Phila., Pa. 1301-5 W. Morehead St., Charlotte, N. C.

TEXTILE PROCESSING PRODUCTS

In Rain or Snow or Muggy Heat

Wherever they are — wherever they may go — our fighting men have the constant protection of fabrics finished to meet the needs of global war. With experience born of peacetime service but with a resourcefulness geared to the needs of war, Arkansas takes pride in producing at top speed for textile processing and finishing plants whose fabrics must meet rigid government specifications.

FUNGICIDES for all types of Government Fabrics

Highly Efficient — Non-Toxic — Non-Irritating

FUNGICIDE M: a single product combining a mildew inhibitor and water repellent for producing a mildewproof water repellent finish on cotton in one operation.

FUNGICIDE P. G.: an anti-mildew agent for mildewproofing cotton by the two bath process.

FUNGICIDE G: used in conjunction with water repellents in a one bath treatment to mildewproof cottons and impart a water repellent finish.

FUNGICIDE A: for cloth coating processes — dissolved directly in the resin solution.

FUNGICIDE P: made expressly for use in the pigment impregnation process.

ARKANSAS CO. INC., NEWARK, N. J.

Established over 38 years

Ernie Pyle, *FAMED WAR CORRESPONDENT.*

finds pure water vital to our fighting men

ERNIE PYLE, FAMED SCRIPPS-HOWARD WAR CORRESPONDENT

". . . you could almost say an army marches on its water," wrote Ernie Pyle in a recent dispatch from the Mediterranean front. "When a water point is found, the engineers wheel in their portable purifying unit. This consists of a motorized pump, and sand filter, chlorinating machine and a collapsible 3,000-gallon canvas tank. The chlorine we inject comes in powder form in 1 gallon cans—we usually use 1 part of chlorine to a million parts of water. The engineers of the 45th Division brought with them enough chlorine to last 6 months. In addition to chlorine, alum and soda ash are injected into the water."

THAT "chlorine in powder form" which Ernie Pyle speaks of is, of course, high test calcium hypochlorite, and, as likely as not, it's Mathieson HTH. That soda ash, too, is probably fused soda ash in tablet form made by Mathieson especially for use by our armed forces overseas.

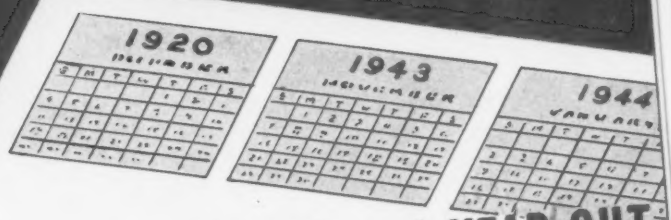
Not as spectacular but just as important a war job is being done on the production front by other Mathieson Chemicals—caustic soda, soda ash, liquid chlorine, ammonia, sodium chlorite, sodium methylate, magnesium metal, liquid and solid carbon dioxide. These products are vital raw materials in nearly every phase of American war production, including ships, planes, tanks, guns, gasoline, clothing, food, medical supplies and many other materials which will go to make up final victory for the United Nations.

Mathieson CHEMICALS

THE MATHIESON ALKALI WORKS (Inc.) 60 EAST 42nd STREET, NEW YORK, N. Y.

LIQUID CHLORINE . . . SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . BLEACHING POWDER . . . HTH PRODUCTS . . . AMMONIA, ANHYDROUS and AQUA . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS . . . SODIUM METHYLATE

Timely Memo



HARTEX PRODUCTS . . . YEAR-IN and YEAR-OUT

- SULFONATED OILS
- RAYON OILS
- DEGUMMING OILS
- BLEACHING OILS
- KIER OILS
- FINISHING OILS
- WOOL OILS
- RESIN FINISHES
- CELLULOSE SOLUTIONS
- SOLUBLE WAXES
- SPLASHPROOF COMPOUNDS
- DELUSTRANTS
- DYE ASSISTANTS
- SOFTENERS
- CATIONIC SOFTENERS
- RAYON SIZINGS
- WARP DRESSINGS
- WETTING-OUT AGENTS
- SYNTHETIC DETERGENTS
- WEIGHTING AGENTS

KOPAN

PERMANENT CELLULOSE FINISH

New and Versatile!

A major development in modern fabric finishing. Creates new and different effects in rayons, marquisettes, sheetings, damasks, shirtings and many types of knitted and woven fabrics. Easy to apply — no special equipment required.

DYPENOL

MERCERIZING PENETRANT

Proven Superiority

The ideal mercerizing penetrant. Completely eliminates boil-out or wet-out. Increases "degree of mercerization." Speeds up production.

REPELON

WATER REPELLENT

Uniform • Dependable

An efficient single bath agent, very stable, readily soluble.

OUR TECHNICAL STAFF IS AT YOUR SERVICE

HART PRODUCTS CORPORATION

1440 BROADWAY • NEW YORK 18, N. Y.

Chemicals for Every Phase of Textile Processing

Looking

NEVER BEFORE have the lives of all of us suffered such dislocations as at present. Never before have we encountered a period which necessitates so much planning for the future. Never before have we had the knowledge and the tools at our disposal to create better standards of living for us all.

This is a challenge to the chemical and textile industries. The opportunity is here and the challenge will be accepted.

Planning for the future is the order of the day. The problems for those of us in these industries are the utiliz-

BETTER THINGS FOR
BETTER LIVING
...THROUGH
CHEMISTRY

E. I. DU PONT DE NEMOURS & CO. (INC.) . . . Organic Chemicals

Ahead

ation of newly developed synthetic fibres and the better adaptation of natural fibres—thus creating fabrics of longer and more lasting beauty. Quality will be the keynote. New chemicals and finishes, together with advances in their application, will make this possible.

* * *

Quality dyes for enduring beauty and better methods for applying them is the Du Pont creed. With due humility, but conscious of our experience and ability, Du Pont technologists will be ready with these things when the time arrives.

Department . . . Dyestuffs Division . . . Wilmington, Delaware

DU PONT DYESTUFFS

JOHN CAMPBELL & COMPANY, INC.

75 HUDSON STREET • NEW YORK CITY

TELEPHONE: BArclay 7-6228-6229

BRANCH OFFICES AND WAREHOUSES:

PHILADELPHIA	BOSTON	EAST CLEVELAND, OHIO	ATLANTA, GA.
BROAD AND SPRING GARDEN STS.	99 BEDFORD ST.	1835 SHELDON AVE.	1008 WILLIAMS MILL ROAD

Quite an Invention, *too!*

The fellow who invented the wheel did quite a job. Just imagine a world without one. But, it's in the *application* of the wheel to all manner of vehicles and machinery, rather than in the wheel itself, that progress has really been made.

In the same way, the principle of continuity has long been known to the textile industry, from the very earliest days. It is the application of the principle that resulted in the power loom, the spinning jenny, the carding machine, and so on. The technicians of Industrial knew continuous operation was the answer to superior rayon yarn—but how to apply it was the problem. That they solved it, is borne out daily as miles of uniform, virtually knot-free yarn stream from the Continuous Process machine, bound for mills that know its value in increased mill efficiency and level dyeing qualities.

It is the ingenuity of our technicians in developing better methods, applying old principles in new ways, that have made Industrial the progressive company it is.

Industrial
RAYON CORPORATION
MAKERS OF
CONTINUOUS PROCESS RAYON YARN
AND Spun-lo KNIT UNDERWEAR CLOTH

•Reg. U. S. Pat. Off.

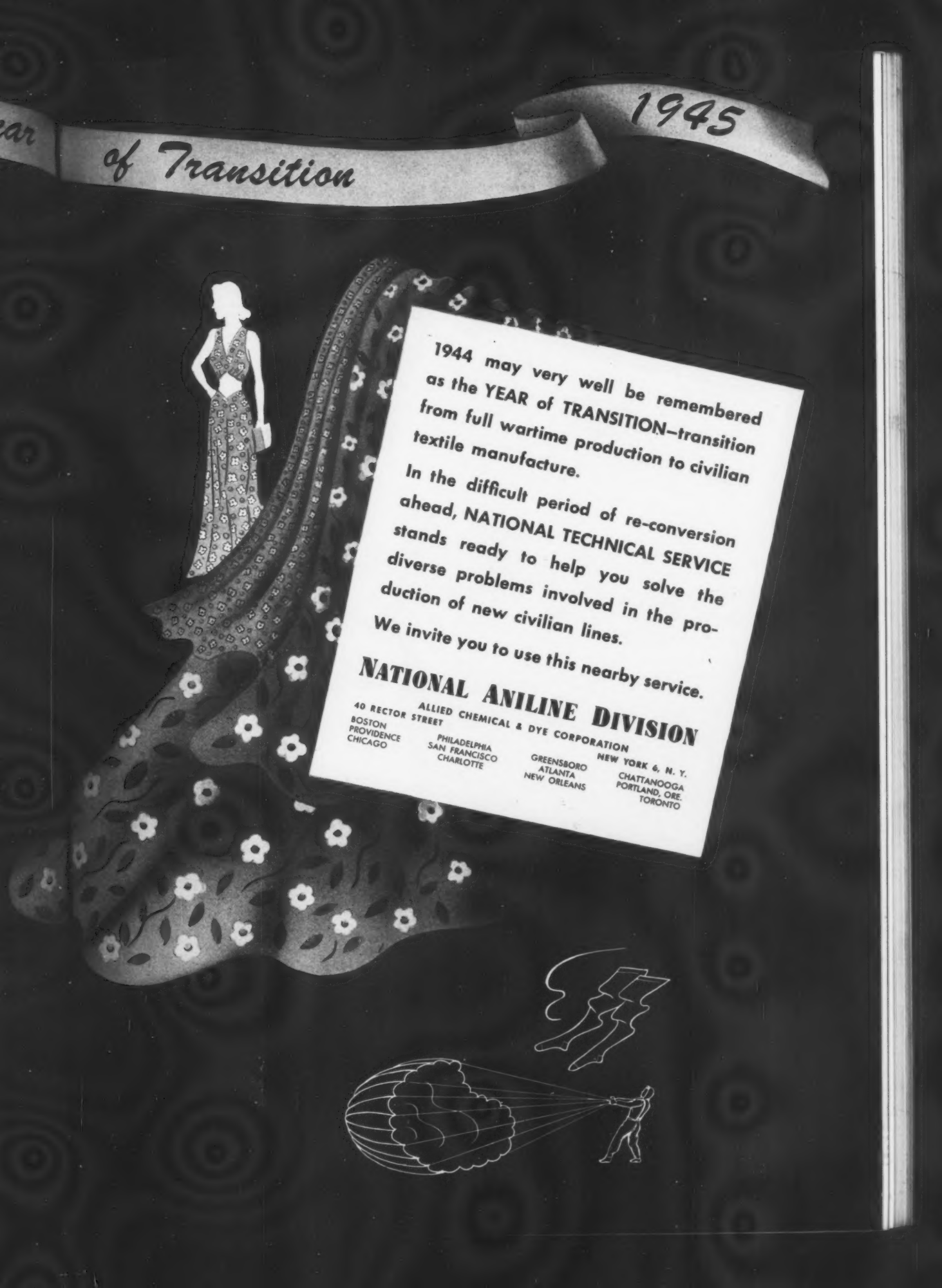
CLEVELAND, OHIO • *New York Office, 500 Fifth Avenue*

1943 - 1944 - The Year

National Technical Service

for practical help on color problems

ear of Transition 1945



1944 may very well be remembered as the YEAR of TRANSITION—transition from full wartime production to civilian textile manufacture.

In the difficult period of re-conversion ahead, NATIONAL TECHNICAL SERVICE stands ready to help you solve the diverse problems involved in the production of new civilian lines.

We invite you to use this nearby service.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET NEW YORK 6, N. Y.

BOSTON · PHILADELPHIA · GREENSBORO · CHATTANOOGA
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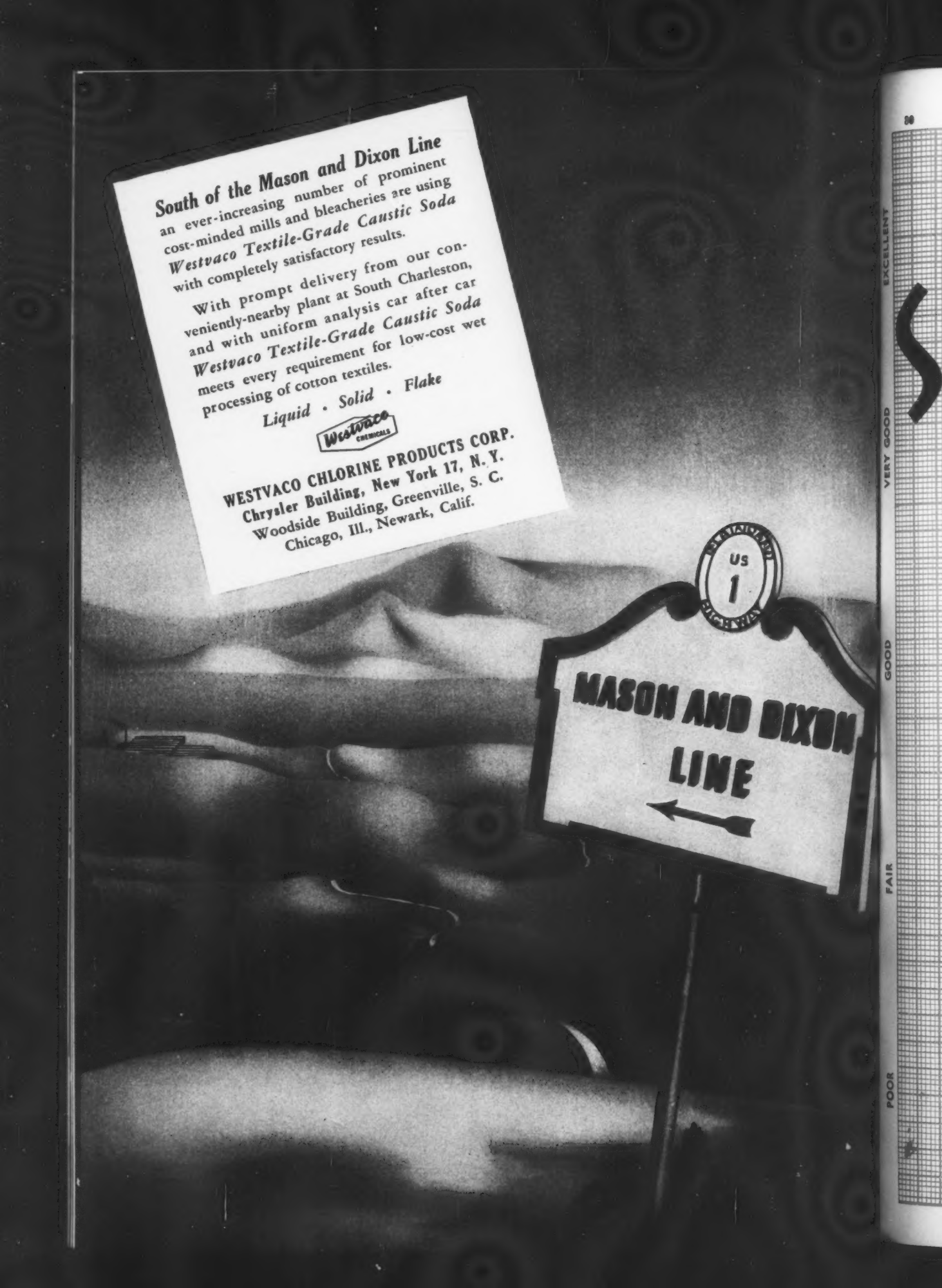
South of the Mason and Dixon Line
an ever-increasing number of prominent cost-minded mills and bleacheries are using *Westvaco Textile-Grade Caustic Soda* with completely satisfactory results.
With prompt delivery from our conveniently-nearby plant at South Charleston, and with uniform analysis car after car *Westvaco Textile-Grade Caustic Soda* meets every requirement for low-cost wet processing of cotton textiles.
Liquid · Solid · Flake
Westvaco CHEMICALS
WESTVACO CHLORINE PRODUCTS CORP.
Chrysler Building, New York 17, N. Y.
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Chicago, Ill., Newark, Calif.
US 1
MASON AND DIXON LINE
POOR
FAIR
GOOD
VERY GOOD
EXCELLENT

HOURS of LIGHT EXPOSURE

80 90 100 110 120 130 140 150 160 170 180 190 200 210

EXCELLENT
VERY GOOD
GOOD
FAIR
POOR

SUPERLITEFAST

Registered U. S. Pat. Office

The TOPS in FASTNESS

for DIRECT DYES

ALTHOUSE CHEMICAL CO.

READING, PENNA.

A COMPLETE LINE OF

DYESTUFFS

for all branches of

TEXTILE DYEING AND PRINTING—

PAPER AND LEATHER

ACID
DIRECT
BASIC
SULPHUR

CHROME
DEVELOPED
ACETATE
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VAT COLORS

For Civilian and Government Requirements

NOVA CHEMICAL CORPORATION

147-153 Waverly Place
New York, 14, N. Y.

WAREHOUSES IN NEW YORK and CHARLOTTE, N. C.

KELTEX *is always* UNIFORM

KELTEX is produced to exact specifications under carefully controlled processing. It is always uniform in its high quality and its effective performance. It is the **modern** thickening agent for use in Print Pastes, Padding Operations, Discharge Work, Direct Dye Printing (on rayons) and Gum Water.

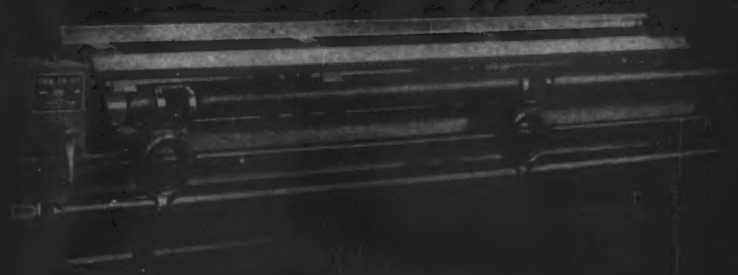
KELTEX
REFINED
ALGIN
PRODUCT

KELCO COMPANY

75 E. Wacker Dr., CHICAGO 1 · 31 Nassau St., NEW YORK 5 · 530 W. 6th St., LOS ANGELES 14

PERKINS AUTOMATIC BIN PILERS

PATENTED

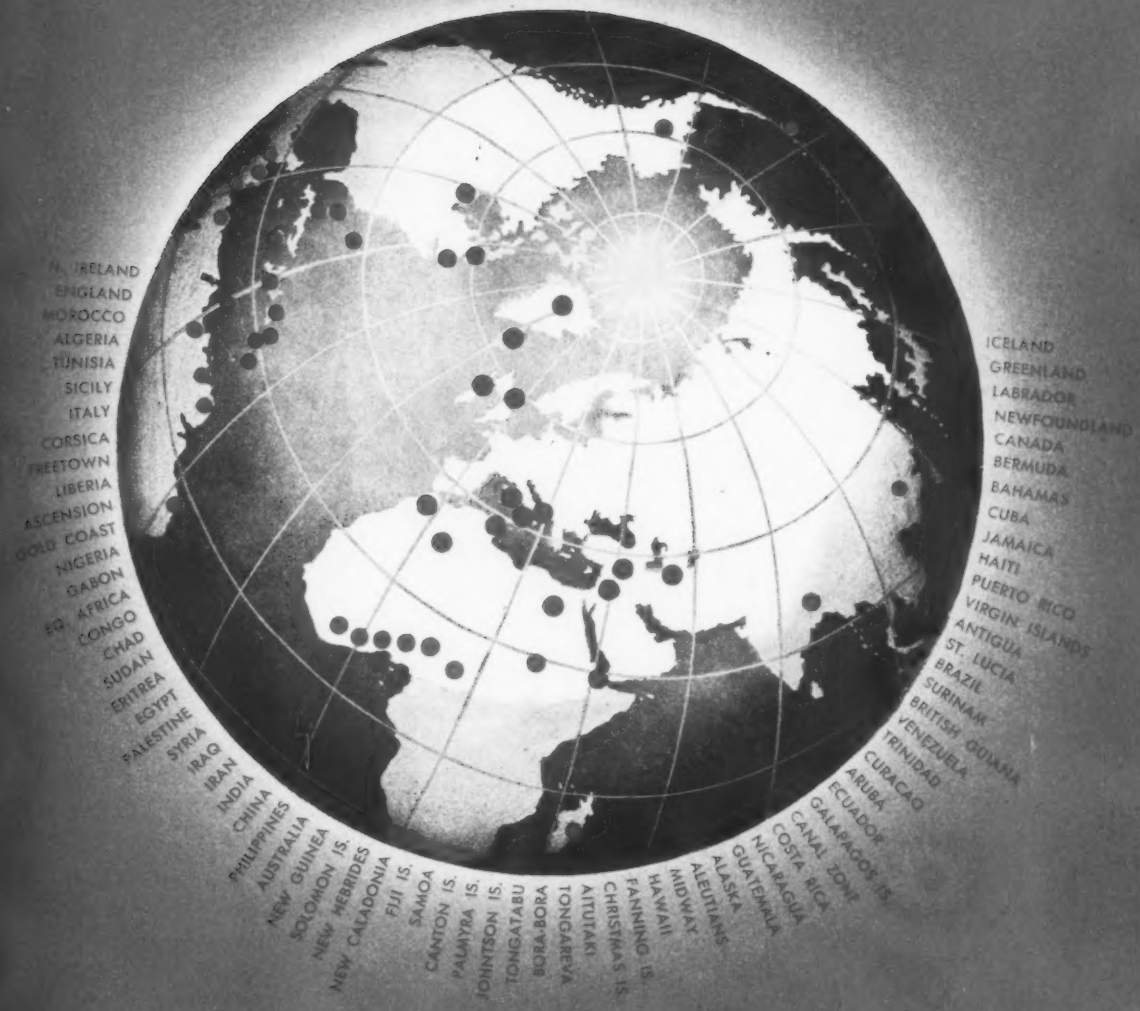


You cannot afford to pile by hand

B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.



our armed forces encircle the globe

There are no boundaries . . . no limits to this world war. ★ It swings from the bleak wastes of the Aleutians to the fore-front of the European fortress . . . from ice-gripped Greenland to war scarred China. In this fierce conflict . . . there is no giving quarter no going half way . . . it is all-out all down the line. Our armed forces, valient in giving their best . . . deserve the best we can give them. ★ By far sighted planning General continues to follow through on all government orders . . . placing its strategic materials in thousands of vital places with the studied timing of an artillery barrage.

GENERAL DYESTUFF CORPORATION · NEW YORK

QUALITY DYESTUFFS

question

Are Red Oil allocations under FDO 53 affecting your soap requirements?

answer

Do something about it... use Tall Oil.

PHYSICAL DATA	LIQRO	INDUSOIL
Specific Gravity 60°F./60°F.	0.97-0.99	0.96-0.98
Pour Point, not over, °F.	45	—
Viscosity—Saybolt Universal at 210° F.—Seconds.	95-120	50-70
Flash Point, °F.	350-370	350-380
Fire Point, °F.	410-430	410-430
Color	Brown	
Lovibond using half col. Yellow—not more than.	70	
Red—not more than.	40	
Moisture—less than, %.	0.4	0.1

CHEMICAL DATA	LIQRO	INDUSOIL
Acid Number	160-170	170-180
Saponification Number.	165-175	170-185
Rosin Acids Number.	80-90	63-71
Iodine Number (WIJS).	140-150	—
Ash—Less than, %.	0.4	0.1
ANALYSIS		
Fatty Acids, %.	45-50	55-60
Rosin Acids, % Calc. as Abietic	42-48	34-38
Sterols, Higher Alcohols, etc., %	6-9	6-10

Tall Oil is being used more and more in textile soaps because of existing shortages of Red Oil.

Tall Oil is a domestic product derived from wood pulp in sufficient tonnages to assist immeasurably in extending Red Oil Supplies. FDO 53 has now been in effect almost six months and because of the large demands for Red Oil in essential war work the remaining reduced supply is being strictly allocated. It is not intended that Tall Oil should entirely replace Red Oil in your soap formulas but it is suggested that it be used to extend Red Oil and thus permit Red Oil to continue its important work in the production of essential war products. Textile Manufacturers making their own soaps and Soapmakers specializing in textile soaps should investigate the possibilities offered by Tall Oil. Compare the range of analyses of both Liqro (crude) and Indusoil (refined) Tall Oils.

SAMPLES AND LITERATURE UPON REQUEST

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP & PAPER COMPANY

230 Park Avenue
New York 17, N. Y.

35 E. Wacker Drive
Chicago 1, Illinois

748 Public Ledger Bldg.
Philadelphia 6, Pa.

844 Leader Bldg.
Cleveland 14, Ohio

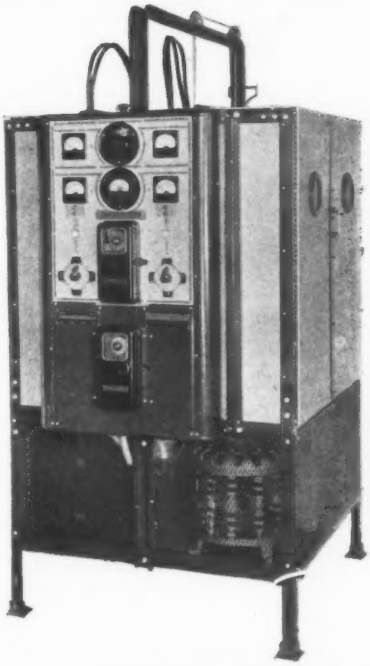
Weathering effects on fabrics accurately reproduced in the laboratory

ATLAS TWIN-ARC WEATHER-OMETER

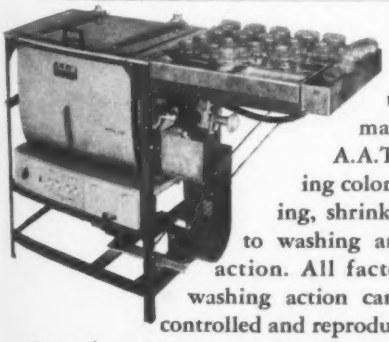
Faithfully duplicates the combined weathering effects of sunlight, rain, heavy dew and thermal shock; accelerated to reduce years of actual weathering to a few days of testing.

The new Twin-Arc Weather-Ometer is equipped to take large size textile specimens in order to meet the new Federal Specifications demanding accelerated weathering tests. Full automatic control of light and water periods is provided by the Atlas cycle timer unit, which can be set to meet standard and special requirements of weathering tests. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included as standard equipment. After setting exposure cycles on the control panel the Weather-Ometer can be safely left in continuous operation over night without attention except to replace carbons once in 24 hours.

The Atlas Weather-Ometer proves the durability of materials under exact conditions of weathering found in actual use in outdoor exposure.



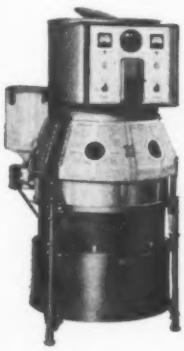
ATLAS LAUNDER-OMETER



The standard laboratory washing machine of the A.A.T.C.C. for testing color fastness, staining, shrinking, resistance to washing and mechanical action. All factors including washing action can be carefully controlled and reproduced identically at any time. The new preheating loading table, increases accuracy of tests by starting all samples at uniform temperature.

ATLAS FADE-OMETER

The recognized standard testing machine for determining the fastness to light of dyestuffs and dyed fabrics. Specimens are rotated around the Atlas Enclosed Violet Arc—the closest approach to natural sunlight — in masked holders. Automatic temperature control to within ±3° F. and humidity regulated by a constant reservoir according to requirements of tests. Operation is completely automatic without attention from operator; can be left in continuous operation overnight.



ATLAS ELECTRIC DEVICES CO.
361 W. Superior Street, Chicago 10, Illinois

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Weather-Ometer, Fade-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

Brilliance with fastness

Woolens, Worsteds and Unions

With more wool being released for consumer wear, the always desirable reds and pinks will come in for their share of popular interest.

With manpower as limited as it is you will naturally be anxious to get the most out of the man hours expended in your production. This efficiency calls for the use of reds and pinks causing a minimum of processing problems and a maximum of salable pieces.

Six readily available Polar Brilliant Reds ranging from the yellow shade to the blue are open to you. Startling in their brilliance:

minimum of processing problems and a maximum of salable pieces.

Six readily available Polar Brilliant Reds ranging from the yellow shade to the blue are open to you. Startling in their brilliance; of good fastness to light, milling and light fulling; effective in neutral, acid or chrome dyeing, their scope is limitless either as self-shades or as shading colors, whether applied on raw stock, yarns, slubbing or piece goods.

For your woolens, worsteds or unions, use:

Polar Brilliant Red G
Polar Brilliant Red B
Polar Brilliant Red 3 B
Polar Brilliant Red 3 B N
Polar Brilliant Red 5 B
Polar Brilliant Red 10 B
(all are patented)

GEIGY COMPANY INC.

89-91 BARCLAY STREET

Boston · Providence
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Geigy

Dyestuff Makers Since 1859

NEW YORK—NEW YORK

In Great Britain
The Geigy Colour Co., Ltd.
National Buildings
Parsonage, Manchester

Pioneering
WITH Pigments
-one of a series of developments illustrating the advantages of Aridye* pigmented colors in new and significant applications

WILL MORE FABRICS BE *Flameproofed* AFTER THE WAR?

When flameproof shrimp nets were proposed for camouflage, a thorough program of development was started by the Laboratories of Aridye Corporation. The conventional type of flameproofing used on duck at the time was found to be unsatisfactory for shrimp netting because of its unique construction. It is not a fabric in the usual sense of the word, but rather a "mesh of wicks", loosely twisted yarns, thousands of air ducts or flues, each tending to feed combustion and make flameproofing more difficult.

The Aridye Laboratories developed a compound for use in an all-solvent method of application and having the advantages of completeness of penetration and ease of mixing. It also kept shrinkage of the nets to a minimum. Known as Aridye CFP colors, this compound contains light-fast pigments, especially selected so as not to aid combustion, binders that increase resistance to weathering and the necessary flameproofing ingredients. The application is a continuous one, consisting of impregnating the fabric by means of a padder and drying in one of the common types of loop dryers. High temperatures are not necessary since Aridye CFP colors require no "curing", in the usual sense, but only the removal of the solvent.

This new development means that you can now flameproof, mildewproof and dye nottingham, tricot, Raschel and lever's lace shrimp nets in one continuous padding and drying operation.

It is expected that this wartime pioneering accomplishment will lead to an increase in flameproofing after the war — proof again of the versatility of pigments — proof also that often pigments offer the best and simplest way of doing the job!

An illustrated, more detailed folder has been prepared on Aridye CFP colors and "after the war" flameproofing. It will be sent without obligation to any finishing plant requesting it. Send for your copy today!

* Reg. U. S. Pat. Off.

Aridye TEXTILE COLORING MATERIALS

ARIDYE CORPORATION • SUBSIDIARY OF INTERCHEMICAL CORPORATION • FAIR LAWN, N. J. • ROCK HILL, S. C. • PROVIDENCE, R. I.

Eastman Blue BNN

Eastman Blue BNN, an anthraquinone dyestuff, is unique among the blues used for coloring cellulose acetate fabrics and nylon. The shades produced by this dyestuff are neutral in cast and brilliant in hue. Its pile-on properties make it suitable for dyeing dark shades of navy, as well as soft Victory blues and brilliant light blues.* Unusual build-up characteristics make possible a saving in dyestuff consumption. It may be used for either box or jig dyeing. It has excellent light fastness, superior to that of most anthraquinone blues.

Eastman Blue BNN and the wide variety of other Eastman Acetate Dyestuffs are the results of careful research and controlled manufacture. For additional information on these dyestuffs, and their application to synthetic fibers, consult our New York Sales Representative, 10 East 40th Street, New York, N. Y., or write TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

EASTMAN ACETATE DYESTUFFS

* By taking advantage of this feature of Blue BNN, more and more dyers are finding it possible to stretch their quotas - T.E.C.

This dinner dress of rayon crepe owes much of its style appeal to the proper application of high-quality processing agents, both before and after the fabric came from the looms. Producers of such fabrics are among the most consistent users of Colgate-Palmolive-Peet wetting, fulling, scouring and dispersing agents—high-quality soaps and detergents made specially for the textile industry. And, these products are equally effective on any type of fabric, regardless of style or material changes resulting from the war. Your local C.P.P. man will gladly give you detailed information on the full line of Colgate-Palmolive-Peet processing agents.

COLGATE-PALMOLIVE-PEET CO.

Jersey City, New Jersey — Kansas City, Kansas
Jeffersonville, Indiana — Berkeley, California

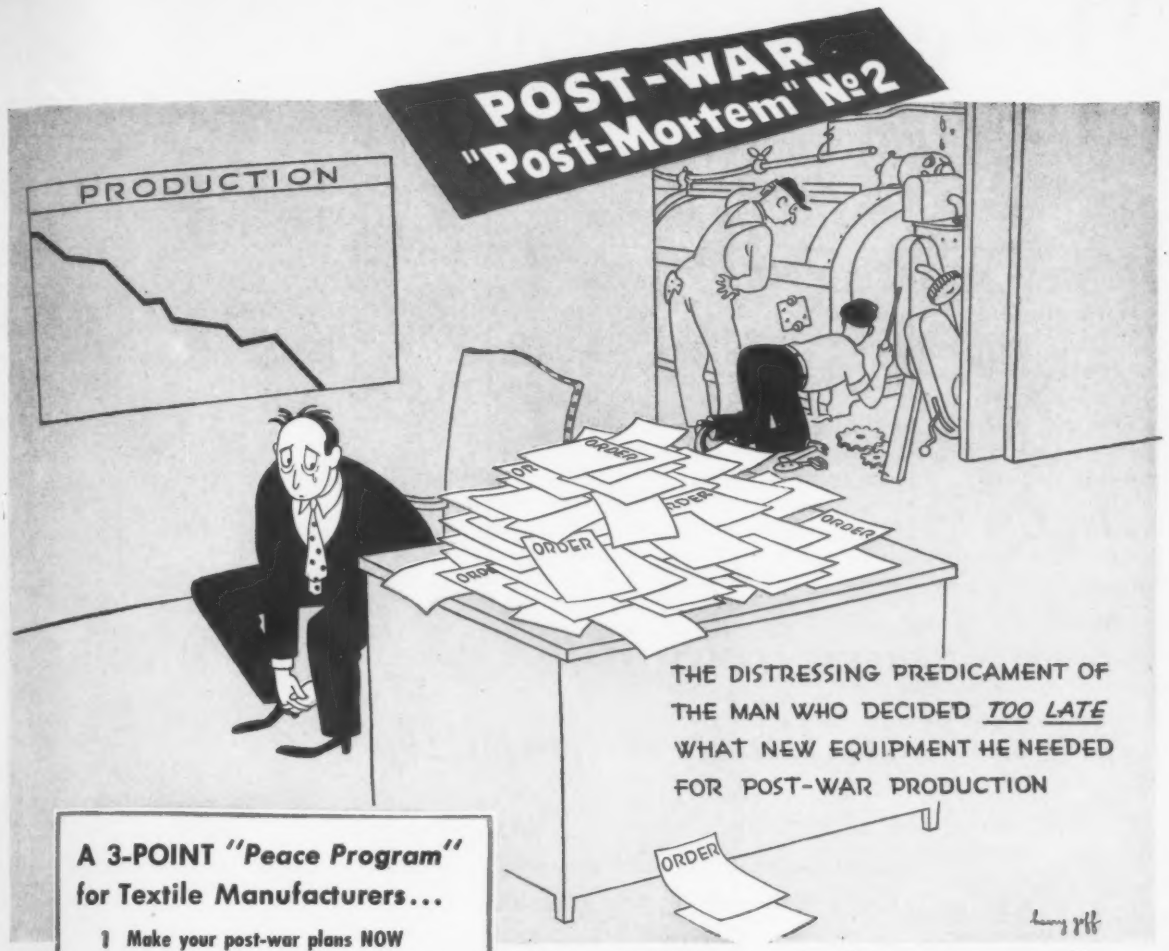
★ ★ ★

COLGATE KWIKSOLV • COLGATE FORMULA 25

BADGER FLAKES

COLGATE WHITE SOAP FLAKES • ARCTIC CRYSTAL FLAKES

DON'T WASTE SOAP
VITAL MATERIALS NEEDED TO WIN THE WAR ARE USED IN MAKING SOAPS



A 3-POINT *"Peace Program"* for Textile Manufacturers...

1 **Make your post-war plans NOW**

don't let peace catch you without definite plans for products, markets, sales and production.

2 **Decide on new equipment needs NOW**

don't wait until the war is over before making a thorough survey of your production equipment and deciding what machines must be replaced.

3 **Order your new equipment NOW**

don't risk serious delay in securing necessary new equipment for post-war production. Metals and other basic materials will continue to be scarce for a long time after the war ends.

If you are going to need new dyeing and finishing equipment after the war, we earnestly recommend that you place your order with us now. Our "Post-War Purchase Plan" assures you prompt delivery when war restrictions are lifted. Write now for complete details of this plan.

The equipment in most textile mills is wearing out rapidly. Much of it will have to be replaced after the war. But a lot of it *won't* be replaced for a *long time* after the war is over . . . just because some manufacturers waited too long to make up their minds what they needed. NOW is the time to do that.

Without interfering with your war effort, we suggest that you make a complete survey of your equipment . . . determine what machines will have to be replaced. But don't stop there . . . *order those machines right away!* If you wait until after the war is over, you may find yourself at the wrong end of a long waiting list.

Ask us about our "Post-War Purchase Plan."

SMITH, DRUM & CO., Allegheny Ave. at 5th St., Phila. 33, Pa.

Smith-Drum Machines Have Always Been a Long Step Ahead . . . In Design, Performance and Sales.

ARMY E NAVY

SMITH-DRUM TEXTILE MACHINES

for hosiery dyeing, skein dyeing, package dyeing, beam dyeing, piece goods dyeing, package drying, skein mercerizing, warp mercerizing, hosiery inspection.

These Chemicals

Chemical	Formula	Boiling Point °C., 760mm.	Vapor Pressure mm., 20°C.	Solubility % by weight at 20°C.		Flash Point Open Cup°F.
				In Water	Water In	
Trichlorethane	$ClCH_2CHCl_2$	113.7	16.7	0.45	0.05	None
Diethyl "Cellosolve"	$C_2H_5OC_2H_4OC_2H_5$	121.4	9.4	21.0	3.4	95
n-Hexanol	$CH_3(CH_2)_4CH_2OH$	157.2	0.7	0.58	7.2	165
Methyl "Carbitol"	$CH_3OC_2H_4OC_2H_4OH$	194.2	0.2	Complete	Complete	200
Hexyl Ether	$C_6H_{13}OC_6H_{13}$	226.2	0.07	<0.01	0.12	170

are available in limited quantities

Here are five synthetic organic chemicals that were available in drum quantities at the time this magazine went to press. Have you investigated their possible uses in your processes? Some of them may help meet your present raw material needs.

Trichlorethane is colorless, non-flammable, and stable under ordinary conditions of use. It is a good solvent and extractant for most oils, fats, waxes, natural rubber, and some types of synthetic rubber.

Diethyl "Cellosolve," a stable ether, dissolves both oils and water and is an excellent mutual solvent. With alcohol, it is a solvent for nitrocellulose.

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Annual Processing Review Number

AMERICAN DYESTUFF REPORTER

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Annual Processing Review Number

AMERICAN

DYESTUFF REPORTER

VOLUME 32 NOVEMBER 22, 1943 NUMBER 24

Alphabetical List of NEW PRODUCTS

Developed Since November, 1942

DYESTUFF AND PIGMENTS • TEXTILE CHEMICALS • EQUIPMENT

WITH the cooperation of the manufacturers of dyestuffs and pigments, textile chemicals, and wet processing and laboratory equipment, we have prepared the accompanying list of products which, it is understood, have been placed on the market or further developed since November, 1942. The list of products has been subdivided according to the classification mentioned and the individual products are listed in alphabetical order. The name of the manufacturer, in an abbreviated form, appears in capital letters immediately following the name of the product. In many cases the abbreviated name of the manufacturer will immediately indicate to the reader the full name of the company. However, supplementing and appearing below, we have listed alphabetically the key name of the manufacturer together with the complete firm name and address.

We have tried to make this list as complete and accurate as possible but there may be some unintentional omissions or errors. If so, we shall be pleased to have such matters called to our attention immediately. We have depended upon the manufacturers to supply us with a complete list of their new products together with information concerning them. The properties claimed for the products are those of the manufacturers. It must be understood, in this connection, that the information we have published is necessarily in a brief form inasmuch as lack of space prohibits the publication of complete details concerning any product. We hope, however, that the information as it appears is sufficiently comprehensive to give the reader a specific idea of the properties and intended uses of the product.

KEY TO MANUFACTURERS' NAMES

AAP—American Aniline Products, Inc., 50 Union Square, New York, N. Y.

ALTHOUSE—Althouse Chemical Co., Reading, Pa.

ALROSE—Alrose Chemical Co., 180 Mill St., Cranston, R. I.

AMALGAMATED—Amalgamated Chemical Corp., Rorer & Ontario Sts., Philadelphia 34, Pa.

AMERICAN MINERAL SPIRITS—American Mineral Spirits Co., 230 North Michigan Ave., Chicago, Ill.

ARIDYE—Aridye Corp., Fairlawn, N. J.

ARKANSAS—Arkansas Co., Inc., P. O. Box 210, Newark, N. J.

ARNOLD-HOFFMAN—Arnold, Hoffman & Co., Inc., Providence 1, R. I.

BICK—Bick & Co., Inc., Reading, Pa.

BIRCH—Birch Brothers, Inc., 32 Kent St., Somerville, Mass.

BRISTOL—The Bristol Co., Waterbury 91, Conn.

BURK-SCHIER—Burkart-Schier Chemical Co., Chattanooga 2, Tenn.

CALCO—Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

CARBIDE AND CARBON—Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York 17, N. Y.

CHEMICAL—Chemical Marketing Co., Inc., 331 Madison Ave., New York 17, N. Y.

CIBA—Ciba Company, Inc., Greenwich and Morton Sts., New York 14, N. Y.

COMMONWEALTH—Commonwealth Color & Chemical Co., Nevins, Butler and Baltic Sts., Brooklyn 17, N. Y.

CONTINENTAL—Continental Chemical Co., 86 Lexington Ave., Passaic, N. J.

CYANAMID—American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.

DUPONT—E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

GALLOWHUR—Gallowhur & Co., Inc., 250 East 43rd St., New York 17, N. Y.

GEIGY—Geigy Company, Inc., 89 Barclay St., New York 8, N. Y.

GIVAUDAN-DELAWANNA—Givaudan-Delawanna, Inc., 330 West 42nd St., New York, N. Y.

GLYCO—Glyco Products Co., Inc., 26 Court St., Brooklyn, N. Y.

HART—Hart Products Corp., 1440 Broadway, New York, N. Y.

KALI—Kali Manufacturing Co., 1410 N. Front St., Philadelphia, Pa.

MAGNA—Magna Manufacturing Co., Inc., 444 Madison Ave., New York 22, N. Y.

MAYWOOD—Maywood Chemical Works, Maywood, N. J.

MORNINGSTAR—Morningstar, Nicol, Inc., 630 West 51st St., New York, N. Y.

NATIONAL—National Aniline Division, Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y.

N. J. ZINC—New Jersey Zinc Co., Inc., 160 Front St., New York 7, N. Y.

NYANZA—Nyanza Color & Chemical Co., Inc., 215 Water St., New York, N. Y.

ONYX—Onyx Oil & Chemical Co., Jersey City, N. J.

P & G—Procter & Gamble Co., M. A. & R. Building, Ivorydale, Ohio.

PAISLEY—Paisley Products, Inc., 630 West 51st St., New York, N. Y.

REFINED—Refined Products Co., Lyndhurst, N. J.

RODNEY HUNT—Rodney Hunt Machine Co., Orange, Mass.

ROHM & HAAS—Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.

SANDOZ—Sandoz Chemical Works, Inc., 61 Van Dam St., New York, N. Y.

SYNTHETIC—Synthetic Chemicals, Inc., 57 Wilkinson Ave., Jersey City, N. J.

TITANIUM—Titanium Alloy Manufacturing Co., Niagara Falls, N. Y.

VAN VLAANDEREN—Van Vlaanderen Machine Co., 370 Straight St., Paterson, N. J.

WARWICK—Warwick Chemical Co., West Warwick, R. I.

WOLF—Jacques Wolf & Co., Passaic, N. J.

DYESTUFFS AND PIGMENTS

A

Acetamine* Yellow N (P. A. F.)—du PONT)—suitable for use on nylon and acetate rayon. It yields medium shades of yellow, wets out and disperses readily and possesses good affinity for both nylon and acetate. This dyestuff shows good all-round working properties, is suitable for open machine dyeing and is not affected by metals in the dyeing equipment. It is stated that it may also be used for printing acetate rayon and nylon piece-goods since it produces a very smooth and satisfactory printing paste. The fastness of Acetamine Yellow N is said to be satisfactory for general use, it discharges to a pure white in both light and heavy shades and is recommended by the manufacturers for application on combination fiber crepes, taffetas, satins, knit-goods. It is an economical shading color for dark greens.

* Registered Trade-mark.

Acetate Printing Black JB Conc.—(CIBA) — a non-anthraquinone acetate black especially prepared for printing rayon.

Alizarine Neutral Green CE — (A.A.P.)—is identical in shade and with the same high rate of fastness to light, washing, perspiration and sea water as carried by Alizarine Green C E Extra, plus the advantage of drawing well from a neutral bath.

Amanil Developed Scarlet A—(A.A.P.)—is said to be among the brightest of developed scarlets and to be featured by very good dischargeability. The color has value as a ground for color discharge *prints* on rayon and cotton dress materials. Fastness to washing and perspiration is good, hence useful for juvenile hosiery work.

Amanil Developed Scarlet 2 BLN—(A.A.P.)—a beta napthol coupling scarlet of moderate light fastness but said to possess good fastness to washing, water and perspiration. Recommended by the manufacturers for ground work where good brightness of shade and tinctorial value are factors and a moderate discharge is acceptable.

Amanil Fast Brown B R L—(A.A.P.)—said to offer a high rate of light fastness coupled with good resistance to acid and alkali perspiration and washing. It is stated that this medium toned brown is of very good solubility, draws evenly in combination and lends itself well to the production of the military shades on cotton fabrics and union knit goods. The color leaves acetate clean and discharges in light and medium depths.

Amanil Fast Olive Drab L. H. — (A.A.P.)—a direct dyeing color particularly well adapted to the production of the various O. D. and Khaki shades on all types of cotton and rayon. A suitable base for cotton and wool lining cloths as well as for the several wool-cotton underwear materials and hosiery. Wash fastness is increased by a chrome acetic after-treatment.

Amanil Fast Orange W S—(A.A.P.) —a bright, red shade of orange said to have a high reputation for excellent solubility and thus suitable for machine dyeing. This direct dyeing color is said to be very fast to acid and alkali and to leave acetate effects clean.

Amanil Fast Scarlets 4BA and 4BS—(A.A.P.)—two bright shades of scarlet for use on cotton and rayon yarns and pieces where good fastness to acid and alkali is important as well as good solubility. Both of these products discharge white and leave Celanese effect threads clean. The 4BA brand is suitable for wool white work when applied from a soap and soda bath.

Amanthrene Brown RRD Paste—(A.A.P.)—a rich shade of vat brown suitable for dyeing cotton and rayon by the various methods, the color being stock vatted to advantage. This dyestuff moreover, is especially recommended by the manufacturers as a supra fix product of merit for the printing of cotton and rayon.

Amanthrene Dark Olive B Paste—(A.A.P.)—a highly dispersed item suitable for pad, pad-jig and package machine work and said to possess a light fastness among the highest in the field. It is stated that these features, combined with exceptionally good fastness to chlorine and washing, recommend the color as of value for military Grey and O. D. shades.

Amanthrene Olive R Paste, Double Paste and Double Powder—(A.A.P.)—an anthraquinone vat dye, the reddish toned olive shade of which and fastness properties lend its use to O. D. shades. Classed, in fact, in list "A" of the Conservation Order M-103. Very good for pad, pad-jig and package machine work.

Amanthrene Printing Violet 4R Paste —(A.A.P.)—a superfix type of vat dye highly recommended by the manufacturers for the printing of cotton and rayon fabrics. The color is likewise well adapted to the dyeing of these fabrics by the stock vat process for the production of full, brilliant red shades of violet down to the most delicate pastel tones. Good all around fastness is said to be an added quality.

Amanthrene Red Brown Double Paste —(A.A.P.)—a vat dye of Anthraquinone derivation. This new product, a rich chocolate shade of brown, is well adapted for the level dyeing of light tan shades. It is said to possess unusually high resistance to chlorine, washing and light which has established its use in the production of the Government shades.

Anthranol Chrome Yellow NYA—(NYANZA)—produces a green shade of chrome yellow said to possess excellent fastness to light, fulling and potting. It is a valuable shading color when used in conjunction with other chrome colors, particularly shades of bright green. It dyes well by the top chrome, bottom chrome and nutrachrome methods.

Anthranol Chrome Yellow SWA—(NYANZA)—produces a medium shade of chrome yellow said to possess excellent all around fastness and to be distinguished from Nyanza's other chrome yellows by its property of leaving silk practically unstained. Some woolen mills are using this color in conjunction with other chrome yellows for Govermnent OD shades in order to balance the carbonizer fastness. Anthranol Chrome Yellow SWA is dyed by the top chrome method, but it also dyes well on chrome bottom and by the nutrachrome process.

Aridye* Camouflage Colors; Aridye* Camouflage Flameproof Colors—(ARIDYE)—pigment colors developed to meet U. S. Army Engineer Specifications, dispersed in a water-in-oil type carrying vehicle. Mildew proofing agent may be included. Suitable for all types of cotton and burlap camouflage fabrics including shrimp netting.

* Reg. U. S. Pat. Off.

Aridye* CX Colors — (ARIDYE) — especially formulated colors for pad-dyeing with an alkali-soluble cellulose ether vehicle (Ceglin‡). Meet requirements for permanency of finish, shrinkage control, weather and slippage resistance. Used on bobbinet, tricot, marquisette and nottingham.

* Reg. U. S. Pat. Off.
‡ Reg. U. S. Pat. Off.

Aridye* SX Colors — (ARIDYE) — water dispersable colors developed for printing or dyeing with a water-soluble carrying vehicle. May be used in a starch or modified starch paste. Also used to add color value to mineral dye baths.

* Reg. U. S. Pat. Off.

Azoathrene Black UF* — (ALTHOUSE)—an aftertreated black cotton and rayon said to possess excellent fastness to washing, perspiration, cold water and salt water. It is further said to be ideal for dyeing on jigs or becks. It is a most useful color for the dyeing of fast rayon and cotton linings or other fabrics requiring wash fastness.

* Registered Trade-mark.

B

Bixacyl Diazo Black G Conc.—(BICK)—a non-subliming dispersed type of acetate dyestuff, yielding jet blacks when developed with Developer BON. Fastness generally is said to compare favorably with that of other similar types.

Bixamine Diazo Black OB—(BICK)—a develop black of good solubility suitable for machine dyeing of cotton and rayon in any form, leaving acetate completely unstained. When diazotised and developed with a diamine, bloomy blacks of excellent fastness to washing are said to be obtained.

Bixamine Fast Brown BRLL—(BICK)—a fast to light brown said to be of particular interest, because of its excellent light fastness, as well as good fastness to perspiration, sea water and rubbing. It is stated that this dyestuff possesses excellent affinity for cotton and rayon, discharges with both alkaline and acid discharge but leaves a very slight creamy white; solubility is good and acetate is not stained.

C

Calco Fluorescent Yellow AB—(CALCO)—a new brilliant greenish-yellow said to possess extreme daylight and ultraviolet fluorescence. This dye is used extensively in fluorescent lacquers and other coating materials. Highly soluble in the hydrocarbons, ketones, and alcohols. Generally used for lacquer purposes.

Calconese Fluorescent Sea Green—(CALCO)—this product produces fluorescent shades on acetate fabrics ranging from a fluorescent white to a sea-green, depending upon the concentration and is applied as a direct dyeing acetate color. Also suitable for use in some types of lacquers.

Calconese Fluorescent Yellow HEB—(CALCO)—a new direct dyeing fluorescent acetate yellow. This color produces a brilliant greenish-yellow shade on acetate which is said to exhibit an extreme fluorescence in daylight and ultraviolet light. Used extensively for government shades.

Calcofast Wool Bordeaux BN—(CALCO)—a metallized dye said to possess characteristics of a chrome color and to have excellent fastness properties. Recommended by the manufacturers because of its pleasing bordeaux shade and excellent fastness to perspiration, washing, carbonizing, good fastness to fulling and light. Much used for men's and women's wear. Can be dyed level on carbonized stock.

Calcocid Brilliant Flavine FF—(CALCO)—a clear greenish wool yellow which can be used to dye bright shades for hand knitting yarns. Has a brilliant fluorescence in ultraviolet light and is suitable for dyeing wool for fluorescent carpets. Stands theatre wear and retains its fluorescence.

Calcophyl Blue RCF—(CALCO)—an organic pigment said to possess high tinctorial value and to yield a red blue shade. It has been developed to meet the durability requirements of pigments for government use, particularly in the field of camouflage coatings. It is characterized by a high infra-red reflectance which is unique for this shade.

Calcotex Olive Drab FR—(CALCO)—an oil-in-water dispersion which has been designed for impregnating camouflage nets requiring only the addition of water for its application. After proper padding and drying, nets colored therewith, are said to meet government specifications for No. 9 Olive Drab, infra-red reflectance, durability, mildew resistance and flame resistance. Fire hazards attendant with the application of many flameproofing compositions are eliminated with the use of this product.

Calcotex Sand FR—(CALCO)—an oil-in-water dispersion which has been designed for impregnating camouflage nets requiring only the addition of water for its application. After proper padding and drying, nets colored therewith are said to meet government specifications for No. 3 Sand, infra-red reflectance, durability, mildew resistance and flame resistance. Fire hazards attendant with the application of many flameproofing compositions are eliminated with the use of this product.

Celanese Pure Blue B EX.—(A.A.P.)—a bright shade of blue recommended by the manufacturers for all types of acetate fabrics and yarns and said to possess a high rating of fastness to washing, perspiration and sea water as well as atmospheric gas fading. The color is of good solubility and especially recommended for dyeing speed and pile-on value. Said to be an excellent base color for navies and other deep shades.

Cibacete Scarlet BRP; Cibacete Red YNB Ex Conc.—(CIBA)—an acetate scarlet and red said to possess excellent dispersibility, especially adapted for acetate printing.

D

Diazophenyl Scarlet 2 B L—(GEIGY)—this new product belongs in the classification of diazotized and developed colors. Unlike most developed scarlets, Diazophenyl Scarlet 2 B L is said to be tinctorially very strong and therefore can be used for producing deep shades at minimum dye costs. Diazophenyl Scarlet 2 B L is particularly interesting for dyeing dark shades of red on cotton raw stock and yarns when results must have reasonably good fastness to washing.

E

Erio Chrome Brown R L L—(GEIGY)—a new addition to the line of Erio Chrome Colors. This new product possesses the usual all-around fastness properties expected of a chrome color, but is said to distinguish itself particularly for its excellent fastness to light. Very pleasant shades of brown can be produced with this dyestuff when applied in either heavy or light depths.

F

Fastolite Yellow WPBF—(ALTHOUSE)—a new direct dyeing yellow for cotton and rayon. It is slightly redder in shade than the Yellow 4GL types. However, it is more level dyeing and more suitable for machine dyeing. It has equivalent light fastness to Yellow 4GL together with superior fastness to washing.

Formanil Violet 2 R—(A.A.P.)—a brilliant, reddish tone distinguishes this product. It is stated that this virtue, combined with good light fastness, very good resistance to washing and perspiration plus good dischargeability and Celanese reserve, gives it a high value for use on cotton and rayon materials. An aftertreatment with Amaform R enhances its all around fastness.

G

Gycolan Colors—(GEIGY)—this group of dyestuffs is particularly adaptable for the dyeing of woolen or worsted piece goods and yarns. They are said to be level dyeing and to produce shades that can be considered as possessing good resistance to light.

This line of colors includes—Gycolan Yellow B E L, Gycolan Yellow G R L Conc., Gycolan Orange G L, Gycolan Orange R L, Gycolan Bordeaux R L, Gycolan Violet 5 R L, Gycolan Dark Green B L, Gycolan Blue G G L, Gycolan Black W A L Extra.

The Gycolan Colors can be used as self shades and, with the exception of Gycolan Black W A L Extra which is recommended for obtaining Blacks only, in combination for producing a wide range of mode shades.

It is stated that these dyestuffs, with the exception of Gycolan Black W A L Extra, can be applied successfully to carbonized piece goods, without neutralizing previous to the dyeing operation. All of them can be used satisfactorily for printing chlorinated piece goods.

N

National Niagara Copper Blue GL—(NATIONAL)—produces reddish blue

shades on cotton or rayon, leaves acetate clear, and discharges to an excellent white. Suitable for aftertreatment with copper and may even be developed. The coppered dyeings are said to possess excellent fastness to rubbing, alkalies and water and very good fastness to washing and perspiration.

National Alizarol Flavine RA—(NATIONAL)—applicable to wool by top, bottom or meta chrome methods, yielding reddish-yellow shades said to possess superior fastness to light, acid and alkalies. Stains silk, but leaves cotton, rayon and acetate effects clear. National Alizarol Flavine RA is also a valuable dye for chrome or bark tanned leather.

National Alizarol Yellow CRM—(NATIONAL)—an excellent product for coloring loose wool, slubbing and yarn. Said to possess excellent fastness to washing, fulling, perspiration ad steaming, and good fastness to light.

National Carbanthrene Black BF Double Paste—(NATIONAL)—an anthraquinone vat dye of outstanding merit for pressure machine work. Said to disperse readily and reduce easily to a highly soluble, level-dyeing leuco. Its deep green shade oxidizes readily with nitrous acid or hypochlorite to a full black said to be of very good fastness to light, washing and fulling.

National Chromolan Blue 3R—(NATIONAL)—a new chromiferous acid dye, producing full navy blue shades on wool. It is stated that its good fastness to light, washing and fulling render it of particular interest for coloring carpet and knitting yarns and the better grades of women's all-wool dress materials.

National Superchrome Black EA Extra—(NATIONAL)—a new chrome dye applicable by either the top chrome or bottom chrome process. Produces full shades of black said to be of very good fastness to light, washing and fulling. Leaves mercerized cotton and rayon clear.

P

Pontachrome* Gray GL—(du PONT)—a chrome color particularly recommended by the manufacturers as a shading component in the production of OD shades on worsted serges, elastiques and shirting fabrics which are used for officers' uniform cloths. It is claimed that it possesses superior fastness to weather and that it is also possible to obtain shades having somewhat better light fastness than can be obtained with products such as Du Pont Alizarine Blue Black B in similar combinations. Should this color be used in dyeing grays on combination fiber material or goods containing effect thread, it has the advantage of leaving cotton, rayon and acetate practically unstained. Silk is stained slightly more and for white decorations it is only suitable in light grays. It is best applied by the chromate method.

* Registered Trade-mark.

Pontamine* Diazo Scarlet N Conc.—(du PONT)—a new developer color which, it is stated, should be of considerable interest because of its very good fastness to washing and discharge properties. It produces a bright, yellowish shade of scarlet being yellower and duller than Pontamine Diazo Scarlet A Conc. 200 per cent on cotton and rayon. Pontamine Diazo Scarlet N Conc. is especially well suited to application on viscose-process rayon and cotton intended for dress goods which are to be subsequently discharged. In addition to its good fastness to washing this color is said to possess generally satisfactory fastness toward other color-destroying influences. Pontamine Diazo Scarlet N Conc. is superior in wash fastness and discharge properties to Pontamine Diazo Scarlet A Conc. 200 per cent. It is readily soluble, level dyeing and exhausts well.

* Registered Trade-mark.

Printing Blue 8G Paste—(CIBA)—a greenish sulfur blue especially prepared for printing viscose rayon. It can be printed in combinations as well as mixtures with vat colors, using the regular vat gum. As a self shade—a turquoise blue, which also provides an excellent base for green shades.

R

Rosanthrene Scarlet RC—(CIBA)—a developed scarlet for cotton and viscose rayon said to possess excellent fastness to washing, perspiration and sea water. It is particularly recommended by the manufacturer as a ground shade for prints because of the exceptional purity of its discharge. Acetate effects are left white.

S

Sol-Aqua-Fast Blue WPBF—(ALTHOUSE)—a direct dyeing blue for cotton and rayon that is said to possess excellent fastness to light, together with very good fastness to washing. It exhausts slowly and dyes level in all percentages. It is adapted for all types of machine dyeing.

Solophenyl Brown B G L Extra—(GEIGY)—another representative of the Solophenyl line and, like its predecessors, is claimed to possess exceptionally good fastness to light as well as good resistance to washing, perspiration, and water bleeding—particularly when applied to viscose rayons. It is stated that Solophenyl Brown BGL Extra, contrary to the majority of other homogeneous direct Browns, yields self shades which are often very popular—shades requiring little or no shading. In most respects, this new dyestuff not only has the same dyeing characteristics but also possesses practically the same fastness properties as Solophenyl Brown GL and Solophenyl Brown RL. These three Browns, therefore, can be used in combination formulas for obtaining almost any of the fashion shades of Browns without resorting to the use of contrasting shading elements like Red, Yellow, or Blue.

Solophenyl Olive G L Extra—(GEIGY)—an addition to the range of fast to light Solophenyl colors. This homogeneous dyestuff yields a true Olive shade, said to possess excellent fastness to light. When applied to cottons and viscose rayons, Solophenyl Olive G L Extra also is said to possess unusually good resistance to washing and water bleeding as compared with the average direct color. This is particularly true when applied to rayons. It is stated that Solophenyl Olive G L Extra should prove a most desirable dyestuff not only as a self shade but also in combination with other Solophenyl colors for producing a variety of fashion shades on fabrics such as draperies, and automobile and upholstery materials where fastness of the highest quality is required.

Solophenyl Orange G L—(GEIGY)—a yellow shade of direct orange that can be used as a self shade or in combination with other level dyeing, fast to light direct colors. It is claimed that, in addition to possessing good resistance to light, Solophenyl Orange G L has good fastness to water bleeding without subsequent aftertreating methods.

Solophenyl Orange 2 R L—(GEIGY)—a further addition to the range of fast to light Solophenyl colors. It produces bright shades of Orange and, like all the types of the Solophenyl series, it is suitable for the production of fast to light shades on cotton and viscose fibers. Solophenyl Orange 2 R L should, therefore, be taken into consideration for fabrics which will be exposed to the effects of sunlight — draperies, upholstery fabrics, outer wear knit goods, etc. Solophenyl Orange 2 R L, furthermore is said to possess good fastness to washing (without aftertreatment) particularly when applied to viscose rayon materials.

Solophenyl Orange T G L—(GEIGY)—a very interesting addition to Geigy's line of fast to light direct colors. This yellow shade of direct orange also comes into the category of direct colors having reasonably good fastness to washing, particularly when applied to viscose rayons. Solophenyl Orange T G L should also be taken into consideration because of its good dischargeability, reserving of acetate effects, etc.

Sulfogene* Olive PCF Conc. — (du PONT)—a new sulfur color, which is a replacement for Sulfogene Olive GNCF Conc. 125 per cent which was recently withdrawn from the market.

* Registered Trade-mark.

Sulfogene Olive PCF Concentrated is a copper controlled type and may be applied to cotton and viscose-process rayon in all stages of manufacture. It is approximately equal in shade to Sulfogene Olive GNCF Concentrated when padded and after treated with chrome and acetic acid, but is somewhat bluer than the older type when dyed by other methods. The fastness properties of Sulfogene Olive PCF Concetrated are essentially similar to those of the GNCF; the same good resistance to light is evident and both products are also comparable in strength.

Sulfogene Olive PCF Concentrated, is said to level, penetrate and exhaust well and dissolve readily. Because of its good general fastness and application properties, this new color is recommended by the manufacturer for the production of olive green and drab shades on work clothing or similar materials.

Superlitefast Blue 8GLN* — (ALTHOUSE)—said to be an extremely light fast direct blue for cotton and rayon. It is further said to be ideal for the formulating of bright greens or blues on the green side, which requires both washing and light fastness. It exhausts slowly and can be used for all types of open or closed machine dyeing. The fastness to light is comparable with them for formulating compound shades requiring maximum light fastness.

* Registered Trade-mark.

Superlitefast* Brown 3RLL—(ALTHOUSE)—a reddish shade of direct brown that is said to be ideal for the dyeing of rust or heavy shades of brown, also for shading purposes. It is preferable to the fast reds for shading, both as to the ease of application and for the lack in fading. It is stated that it has excellent solubility, exhausts slowly and may be used for both open and pressure machine dyeing. It is said to possess excellent fastness to washing and may be used in dyeing wash and light fast fabrics.

* Registered Trade-mark.

V

Vegentine* Fast Red 6BA 130%—(ALTHOUSE)—a direct dyeing red for cotton and rayon similar in dyeing and fastness properties to the commonly known Scarlet 4BA and Red 8BA types. The shade is in between these two colors, therefore is a more satisfactory base for the common fashion shades.

* Registered Trade-mark.

Z

Zinc Sulphide Luminescent Pigments—(N. J. ZINC)—fluorescent and phosphorescent pigments for use in textiles to give unusual decorative, costume, and accessory effects. Fluorescence is visible only during activation by an ultra-violet (black) light, while phosphorescent pigments emit visible light under activated light of any type and continue to glow long after the actinic light has been removed.

TEXTILE CHEMICALS

A

Acrawax C Powdered—(GLYCO)—a synthetic wax with a high melting point (275° F.) recommended by the manufacturers as a waterproofing agent for textiles to withstand boiling water. Also as an anti-blocking agent for polyvinyl butyral. Used for waterproof coatings for raincoats, etc.

Aero Brand Soluble Oil 912—(CYANAMID) — a sulfonated oil useful for pasting and dispersing naphthols without the use of alcohols.

Aero Brand Soluble Oil CEL No. 1—(CYANAMID)—a sulfonated red oil of high concentration used as a dispersing agent and dyeing assistant.

Aerotex 141 — (CALCO)—a synthetic resin emulsion used in connection with starch and gums as a binding agent in back sizing, particularly carpet fabrics.

Aerotex 141—(CYANAMID)—a synthetic resin emulsion used in connection with starch and gums as a binding agent in back sizing, particularly carpet fabrics.

Aerotex 667—(CALCO)—a synthetic resin emulsion recommended by the manufacturers for the finishing of low count fabrics where a full, stiff hand is required.

Aerotex 667—(CYANAMID)—a synthetic resin emulsion recommended by the manufacturers for the finishing of low count cotton fabrics where a full stiff hand is required.

Aerotex 7511—(CALCO)—an emulsion blend of synthetic resins. Recommended by the manufacturers as an agent for producing fullness and body in low count cotton fabrics.

Aerotex 7511 — (CYANAMID) — an emulsion blend of synthetic resins. Recommended by the manufacturers as an agent for producing fullness and body in low count cotton fabrics.

Ahcofix A—(ARNOLD HOFFMAN)—a synthetic color fixation agent said to be resistant to washing and dry cleaning. Finishing operations are reduced to a minimum due to softening effect of treatment.

Ahcowet LMA—(ARNOLD HOFFMAN)—a liquid synthetic wetting agent particularly adaptable to kiering and dyeing operations. It is said to be salt free and resistant to hard water.

Alkapen B-40—(BURK-SCHIER)—a new addition to the Alkapen series of wetting agents for mercerizing. It is applied directly in the caustic bath. Alkapen B-40 is especially designed for use in caustic liquor of lower concentration than the usual mercerizing bath, and is said to afford maximum wetting at minimum cost to the mercerizer using low twaddle caustic.

Alkapen 55 — (BURK-SCHIER) — another of the Alkapen series of mercerizer's assistants. It is intended for use in high concentration mercerizing baths, particularly where a bright luster is desired.

Alromulsol—(ALROSE)—a mineral oil emulsifier. One part Alromulsol cut with four parts mineral oil blends into a clear oil which, on addition to water, is said to form stable emulsions. Recommended by the manufacturers for cotton and woolens wherever stable, odorless, soluble oils are desired. May be used as a cutting oil in the metal field.

Alropel—(ALROSE)—a line of single bath emulsion type water repellents which includes Alropel GP and Alropel P for straight water repellency, and Alropel LN, Alropel G-4, Alropel CU, and Alropel DC-7 for combination water repellency and mildewproofing.

Alropel S T—(ALROSE)—a solvent type water repellent conforming to government specification PQD No. 115B and designed for mobile laundries, dry cleaning establishments, and the processing of sole leather in the shoe industry.

Ammonyx T—(ONYX)—a surface active cationic antiseptic and moth repellent useful for application to all types of textile material. It is stated that Ammonyx T is resistant to electrolytes, imparts a soft hand to textile fabrics and tends to increase the resistance of fabrics dye with certain direct colors to wet treatments.

Amsco No. 46 Spirits, Amsco Mineral Spirits, Amsco Stoddard Solvent, Amsco Naphthol Mineral Spirits — (AMERICAN MINERAL SPIRITS)—these industrial petroleum solvents also find wide use in textile processing such as pigment dyeing and printing, flame, mildew and waterproofing.

Amsco Solv. B-D-F—(AMERICAN MINERAL SPIRITS)—aromatic petroleum solvents, of varying evaporation rates, recommended for use in the various phases of pigment dyeing, pigment printing and other types of textile processing such as flame, mildew and waterproofing.

Aquakal—(KALI)—said to be a very fast penetrant used for re-wetting in Sanforizing, also in the dyeing of raw stock piece goods and in the pasteing of vat colors. It is made by esterification and sulfonation of vegetable-animal oils.

Aridex* LS — (du PONT) — a new product which is said to impart a high degree of water repellency at a low cost to textile fabrics. It is a stable, white, acidic, aqueous dispersion of aluminum salts and wax and possesses similar properties to other Aridex types which are well-known, one-bath water repellents. Aridex LS may be applied to cotton, viscose-process rayon and cellulose acetate fabrics in a continuous process by padding, while the batch process in a piece dye kettle is preferable for wool and pure silk.

* Registered Trade-mark.

Aripel F S—(ARKANSAS)—an improved anti-gas fading agent that is used in finishing dyed acetate rayon to improve the resistance of the color to the action of atmospheric gases.

B

Burk-Schier* PWT — (BURK-SCHIER)—a soap extender said to possess excellent wetting and detergent properties in its own right. Although primarily offered to replace appreciable quantities of scarce soaps, Burk-Schier PWT is a capable wetting agent and has good detergency. It is supplied in convenient liquid form possessing exceptional stability.

* Registered Trade-mark.

C

"Cellosize"* Hydroxyethyl Cellulose WS—(CARBIDE and CARBON)—an aqueous solution containing 10 per cent of hydroxyethyl cellulose. It is of interest for sizing applications in which starches, gums, gelatins, soluble resins are commonly used in textile processing. It tends to increase the solubility of the dyestuff in textile printing and shows promise in water paints since it can bind large amounts of pigments. It is stated that, unlike starch and gelatin sizes, it will not mold. In addition, it is a good protective colloid for the aqueous dispersion of oils, fats, waxes, and pigments.

* Trade-mark.

Cerol TGI—(SANDOZ)—a combination waterproof/mildewproof emulsion which is said to be very stable. Produces a satisfactory hand on all woven cotton goods or rayon goods. Emulsion based on low melting paraffin waxes combined with Dihydroxy-Dichlor Diphenylmethane. No curing required.

Comco Softener G X—(COMMONWEALTH)—a cationic softening agent claimed to produce a permanent soft finish on rayon and cotton. It is stated that it does not discolor whites or dyed shades.

Compound G-4—(GIVAUDAN-DELAWANNA)—said to be a non-toxic, non-irritating fungicide and anti-mildew agent for cotton fabrics. Suitable for processing U. S. Army ducks, nettings, etc. Chemically known as dihydroxy dichloro diphenyl methane. Can be incorporated with water-repellents, solvents, etc.

Conco 120 C—(CONTINENTAL)—a synthetic organic detergent which is said to be fast to hard water, acid or alkali. Most effective on wools and rayons in the dye bath as a dye assistant.

D

Deceresol 18—(CYANAMID)—a synthetic detergent which is said to retain its detergency over a wide range of pH. It is stable in boil-off baths and in kier boiling at high alkalinities as well as in scouring after printing where neutral or acid conditions may prevail.

Deceresol 22—(CYANAMID)—a new synthetic surface active agent useful for solubilizing soap in the presence of electrolytes and increasing the salt tolerance of soaps. It is stated that it will also preserve the detergency of soap at hydrogen ion concentrations as low or a little lower than neutrality.

Deceresol ST 10% — (CYANAMID) —a new softener for wool and wool mixed fabrics. Exhausts from an acid bath. Deceresol ST 10% is said to be extremely stable and will not discolor or become rancid in the goods upon prolonged storage.

Dypenol HV—(HART)—a new mercerizing penetrant claimed to possess exceptionally high wetting out properties. This Dypenol is especially recommended by the manufacturers where recovery of the caustic is carried out under high vacuum evaporation. It is stated that Dypenol HV will eliminate all boiling out of yarns or fabrics prior to mercerizing and will insure full mercerization in minimum time.

E

Ethylbutyl "Cellosolve"*—(CARBIDE AND CARBON)—a colorless liquid that boils at 186°C. It is almost insoluble in water (0.45 per cent at 20°C.) but has mutual solvent powers similar to those of the diglycol ethers such as Diethyl "Carbitol" and Methyl "Carbitol." Used in synthetic resin lacquers, it should produce excellent gloss, lack of orange peel, and toughness of film.

* Trade-mark.

F

Fastogene — (A.A.P.) — an auxiliary product said to be of great value for rendering ordinarily fugitive dyestuffs on cotton, rayon and multi-fibred materials fast to water by the simple expedient of an aftertreatment. This specialty is particularly recommended by the manufacturer for treatment of direct dyed ground shades which are to be discharge printed since bleeding into the white discharge during the rinsing process is thus prevented.

Fen-Aseptic—(AMALGAMATED)—a water miscible emulsion containing both water repellent and anti-mildew features. The chemical which makes the fiber anti-mildew is an organic derivative which is non-toxic and non-irritating to the skin. It is claimed that its use on cotton fabrics tends to prolong the life of the garment.

Flameproofing Agent 313—(GLYCO) —a white crystalline powder completely soluble in water. Used in the flame-proofing of textiles, especially where the elimination of after-glow is an important factor.

Flameproofing Assistant — (COMMONWEALTH—a water soluble non-volatile alkyl compound recommended by the manufacturers as a softener to be used with flameproofing salt mixtures.

Formaset* F.— (WARWICK) — a durable type flameproofing finish which is applied to the fabric in water solution and converted to the insoluble form by the application of heat.

* Trade-mark.

Fungicide A—(ARKANSAS)—a mildewproofing agent offered particularly for processing coated cotton cloth. It is added directly to the resin solution which is used in coating the cloth and when applied in that manner is said to impart the necessary mildew protection without affecting the quality of the finished fabric.

Fungicide M—(ARKANSAS)—a combination anti-mildew water repellent compound that is used in a single water bath treatment to impart a mildewproof water repellent finish to cotton thread or cloth. It is said to be markedly effective in preventing the growth of cellulose consuming mould and when properly applied, produces results which easily meet U. S. Government specifications covering the mildewproofing of cotton fabrics in a water bath.

H

Hartexsize W—(HART)—a synthetic wax-like size used in solvent solution for throwing of rayon yarn for hosiery knitting. It is said to permit high twists, impart lubricity to the yarn, and minimize sleazy knitting and press-offs.

Hydrocide* 10X—(ROHM & HAAS) —a water-soluble, substituted quaternary ammonium salt which is said to be an effective mildewproofing agent, particularly resistant to chaetomium globosum and metarrhizium.

* Trade-mark.

***Hydroxy Mildewproof 2**—(KALI)—approved by U. S. Army Corps of Engineers (Specification No. T-1452-A) for mildewproofing fabrics, threads and cordage.

* Trade-mark.

(Continued on page 539)

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

NOVEMBER 22, 1943

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Members should notify the **Secretary** immediately of all address changes.

ACCELERATED WEATHERING TESTS*

HENRY L. YOUNG

Aridye Corp.

FOLLOWING the discussion on accelerated weathering tests at our meeting last June, your chairman asked me to look into the matter and report further. The need for accelerated weathering tests is relatively new to the textile industry as a whole and is the result of government orders for textiles which must withstand weathering. The paint and varnish and roofing industries, however, have been working on the problem for a great many years. Therefore, it seemed desirable to consult with representatives of these industries as well as with the men in various government departments who are at present testing fabrics to see if they conform to weathering specifications. These conversations confirmed the earlier feeling that accelerated weathering tests are not standard and duplicable.

There are two commercially available machines—the Atlas Weather-Ometer, made by Atlas Electric Devices Co. of Chicago, Ill., and the National Accelerated Weathering Unit, made by National Carbon Company of Cleveland, Ohio. The latest model of Atlas Weather-Ometer has two arcs but many of the single arc units are in use.

It was found that wide variations have been observed in tests of the same sample on the same machine. This applies to all models of both makes. Moreover, there has been no observable correlation between tests of the same fabric made on the two different makes of machines; and there is no known correlation between results on any machine and outdoor exposure.

Very apparently the need was to get representatives of the two machine builders together with representative users to discuss standardization of as many variables as possible.

Much of this testing work is carried on at the National Bureau of Standards. Since part of its function is also to work with industry in developing commercial standards, that seemed the logical meeting-ground. Accordingly the suggestion was made to William D. Appel that he call such a meeting. This he did on August 23, acting in his capacity as Chairman of the Textile Committee of the Federal Specification Executive Committee. Those present, in addition to Mr. Appel, who presided, were as follows:

C. W. Jameson, Atlas Electric Devices Co., Chicago, Ill.

C. G. Ollinger, A. S. Calloway, and E. R. Geib, National Carbon Co., Cleveland, Ohio.

H. A. Ehrman, Secretary, Technical Committee on Textiles, F.S.E.C., National Bureau of Standards, Washington, D. C.

E. F. Hickson, Chairman, Technical Committee on Paint, F.S.E.C., National Bureau of Standards, Washington, D. C.

Dr. Joseph Mattiello, Office of the Quartermaster General, Washington, D. C.

P. C. Botzenmayer, Corps of Engineers, U. S. Army, Fort Belvoir, Va.

James Redmond and A. J. McQuaide, Jeffersonville Quartermaster Depot, Jeffersonville, Ind.

Henry A. Rutherford, Textile Foundation, National Bureau of Standards, Washington, D. C.

Dr. O. G. Strieter, Asphalt Roofing Industry Bureau, National Bureau of Standards, Washington, D. C.

R. F. Tener, Organic and Fibrous Materials Division, National Bureau of Standards, Washington, D. C.

and the writer, representing the American Association of Textile Chemists and Colorists. Dr. A. O. Small of the Office of the Quartermaster General, and a representative of the Bureau of Ships, Navy Department, were unable to attend but copies of the minutes were sent to them.

Mr. Appel in opening the Conference said that the purpose was to consider the possibility of defining some of the more or less arbitrary conditions for routine accelerated weathering testing in order to eliminate unnecessary divergence in results of tests. For this reason he asked the conferees not to concern themselves with the value of accelerated ageing tests, the relative merits of the two machines, or with correlation between machine tests and outdoor exposures.

After general discussion in which there was substantial agreement on the factors that could and should be standardized, each of these factors was taken up individually. Agreement was reached on the following testing conditions:

AIR TEMPERATURE

The temperature of the accelerated weathering test is to be defined as the temperature of the air (not of the specimen) indicated by a bare mercury thermometer, the bulb of which is located at the same distance from the arc as the surface of the specimens and in the horizontal plane passing through the center of the arc. The bulb shall be hanging free in the air. It shall be located at least 180 deg. from the position where the specimens leave the water spray, in the direction of rotation of the drum, to avoid cooling by evaporation of water. The machine shall

* Presented at meeting of Research Committee, October 23, 1943.

be full of specimens (or dummies) except for one holder which is removed to make room for the thermometer. The machines should be in operation long enough for the thermal equilibrium to be established before reading the thermometer. The rotating drum may be held stationary momentarily while the thermometer is read.

Standard Air Temperature

The temperature of the air in the accelerated weathering test for textiles, paint, and roofing materials shall be 135° F. ± 10° F.

WATER

Standard Temperature of Water

The temperature of the water entering the spray shall be 80° F. ± 10° F.

Standard Pressure of Water

The pressure of the water entering the spray shall be 25 to 30 lb. inclusive.

Standard Amount of Water

The quantity of water delivered to the specimens shall be 1.2 to 1.4 gal. inclusive per hour per spray nozzle.

Quality of Water

Deposits of salt and of oxides of iron from the water have given difficulty in accelerated weathering tests in certain localities. It was agreed that a purification treatment might be necessary on some waters and would be desirable on all as a means of standardization. This point was investigated further by a subcommittee which has since reported in favor of Amberlite deionized water as being economically possible and chemically acceptable. This is being investigated further.

Spray Head

The nature of the spray, direction relative to the face of the specimens in the testing machine, and similar considerations will have to be considered further. A subcommittee consisting of Messrs. Tener, Mattiello and Botzenmayer agreed to make recommendations.

SIZE OF SPECIMENS

The size of specimens varies with the kind of material and tests to be made after exposure. No standards were selected.

POSITION OF SPECIMENS IN MACHINE

It was agreed that when specimens are exposed in two rows, the upper and lower rows should be inter-changed in position every 24 hours. On the National and the Single-Arc Atlas machines the individual specimens should not be turned top to bottom because this would keep one end of the specimen further from the arc at all times. On the Atlas Twin-Arc machine the two samples are mounted in one frame and the entire frame should be inverted.

OPERATION OF ARC

It was agreed that the arc should be operated according to the directions of the manufacturer. The glass filters supplied with the machine should be used and should be cleaned thoroughly each day. Globes for the Atlas machine should be discarded after 1,500 to 1,800 hours of use. The representatives of National Carbon Co. agreed to report later on the useful life of the filters for their machine and the desirability of changing the positions with respect to the spray.

Variations in Carbons

There was some thought that moisture adsorbed from the air over a period of time would change the burning rate of the carbons. This has since been investigated by National Carbon Company who have advised that even soaking in water does not affect the burning rate.

WEATHERING CYCLE

It was agreed that the cycles of wetting and drying should be timed so that specimens will dry out completely. Further tests are to be made on this point with the possibility of substituting different timing cams.

The meeting was adjourned with the understanding that further work would be carried on, mainly by correspondence.

* * *

Mr. Chairman, I accepted your appointment last June as a temporary one to get the facts on which your Committee might decide what further action should be taken. After a preliminary exploration it seemed best at the time to cooperate with an interested outside group rather than to organize an A.A.T.C.C. committee to study the subject. This group has made rapid progress under the leadership of Mr. Appel and is in position to coordinate the work of various associations interested in the problem. You may wish now to appoint a Committee on Accelerated Weathering but whether or not this is done I would suggest that some one be delegated to maintain contact with Mr. Appel's group and so bring to you their final recommendations on standard methods. These will have the advantage of being uniform with those of other associations.

FOURTH ANNUAL INTERSECTIONAL CONTEST

AS PREVIOUSLY reported, the winners of the Intersectional Contest, held in New York City on October 22, were: *First*—Philadelphia Section; *Second*—Northern New England Section; *Third*—New York Section. The following scale of values was used in judging the papers: practical value—30 per cent; scientific value—30 per cent; originality—30 per cent; presentation—10 per cent. The judges were as follows: Chief Judge, Louis A. Olney; New York Section, Henry F. Herrmann; Southeastern Section—Robert W. Philip; Rhode Island Section, Ben Verity; Piedmont Section, L. J. McGinty; Philadelphia Section, Dr. E. C. Dreby, III; South Central Section, Samuel L. Hayes; Northern New England Section, C. H. A. Schmitt; Mid-West Section, Virgil Hartquist.

The complete papers are published on the following pages.

Intersectional Contest— ★ First Prize Winner ★

MINIMUM CHROME NECESSARY
for Afterchrome Dyeing

Presented for the Philadelphia Section

by HENRY E. MILLSON

COMMITTEE

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Arthur W. Etchells, Hellwig Silk Dyeing Co.
Henry E. Millson, Calco Chemical Division, American Cyanamid Co.
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Richard B. Stehle, Brehm & Stehle

ONE of the most challenging and intriguing, yet little investigated dyeing problems has for years been centered in the top or after-chrome method for wool. The method has been well established through years of use and apparently has been built upon the trial and error system. The very generally accepted amount of chrome has been based on half the weight of dye used. When very light shades were encountered the ratio sometimes showed half as much dye as chrome. No explanation has been offered for this practice except that, "that is how it always has been done." Usually it has been thought that an excess of chrome is desirable and that it can do no harm.

Since bichromates have been restricted because of the war, dyers have become "chrome conscious." It is well known to the spinner of woolen and worsted yarns and to the dyer that the quality of wool dyed either acid or chrome is impaired as the depth of the shade increases and that chrome dyeing does not give a hand equal to acid dyeing.

It was thought that a paper on the "safe use of minimum chrome" would serve as an important guide and accomplish the following results:

1. A real cut in the usage of a strategic material;
2. An improvement in strength, hand and general properties of the fibers dyed by the top chrome method;
3. Improvements in ultimate fastnesses;

We hope with this work to show how the dyed product can be improved, and to effect a saving of strategic chemical by using it more quantitatively and efficiently.

From what could be found in the literature, no intensive work of this particular type has been done. Some chrome economies [1,2,13] have been suggested without giving experimental data to support the cases.

At the beginning it was necessary to obtain figures from some dye manufacturers in regards to the purity of the dyes chosen, the molecular weights [3,4] and the combining weights with bichromate We selected dyes which are in popular use and about which chemical information is well established.

There exists in practice a wide variety of dyeing conditions. For the purpose of study it was necessary to agree upon a standard method of application. Several laboratories contributing to this work made experimental dyeings with various proportions of material and dye liquor, i.e., 1:20, 1:40, 1:60 and 1:80. The dyed results were similar but favored the longer baths. It was decided that the following proportions and formulas offered the best practical possibilities and were adopted for this work.

TABLE I
Dyeing Procedures
1 part of dyed material—40 parts liquor

	Standard	*A*	*B*	*C*
Dye	0.25 or 2%	3%	2 or 3%	0.25%
Anhydrous Glaubersalt	10%	10%	..	..
Ammonium Sulfate	5%	5%	..	..
Acetic Acid 56%	..	..	5%	2%
	Enter at 120° F.			
	Raise to 204° F. in 30 minutes			
Minutes at 204° F.	15	15	30	30
Acetic Acid 56%	1%	1%	5%	4%
Minutes at 204° F.	15	15	30	30
Acetic Acid 56%	2%	2%	..	..
Minutes at 204° F.	15	15	0	..
Acetic Acid 56%	..	3%	Make fresh bath	
Minutes at 204° F.	..	15		
Sodium Bichromate	X%	X%	X%	X%
Acetic Acid 56%	..	..	5%	5%
Minutes at 204° F.	30	30	60	60

WOOL-CHROME

Information on the chemistry of chrome reactions with wool [5,6,7,8,14] is vague. Wools vary somewhat in structure and chrome is capable of assuming valences of 2, 3, 6 and more. Part of the chrome in dyeing is generally believed to react with the wool to form a wool-chrome complex. Bichromate is a strong oxidizing agent and as such is destructive to wool. It was thus deemed necessary to establish if possible a quantitative relationship in the chrome-wool reaction.

A series of chromings was made employing the standard method without dye, using 0.00, 0.10, 0.15, 0.20, 0.25, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90, 1.00, 1.50, 2.00, 2.50, and 3.00% sodium bichromate. The end products of the wool-chrome reaction were not determined as this would require a great deal of fundamental research which is beyond the scope of this paper.

This range of chromed wools was subjected to 24, 48 and 96 hour exposures in a fadeometer and to the A.A.T.C. C. No. 3 wash test. The 0.00 and 0.10% bichromate treatments were yellowed slightly. The 0.15, 0.20, 0.25 and 0.30% showed the best stability to light in each group of exposures. The 0.40% of bichromate and upwards showed distinct alterations in the 24 hour exposures and the alteration increased with larger amounts of chrome changing progressively greener, indicating further reduction. In the wash tests the same trend was observed. Bleeding into the wash liquor began at 0.40% and increased with the amount of bichromate. This suggested combined and uncombined bichromate, with the latter soluble and incompletely reduced.

TEST PROCEDURE

10 gram skeins of 64's knitting worsted were treated according to the "standard procedure," without dye, with various amounts of sodium bichromate. The volume of the bath was held as closely as possible to 400 ml. At the end of a 30 minute chroming period, the excess liquor in the skein was squeezed back into the bath. The wet skein was then weighed to determine the amount of exhaust liquor still held. This amount was allowed for in calculating the total amount of bichromate in the exhaust bath. The exhaust bath itself was cooled and made up to 500 ml. Aliquot portions were then used for the analyses.

COLORIMETRIC ANALYSIS

It has been shown [9] that the reddish purple color formed by diphenyl carbazide and bichromate follows Beer's law in all concentrations below 3.6×10^{-4} molar bichromate, and is extremely sensitive.

Solutions of known concentration of pure potassium bichromate were made in distilled water. To 50 ml. of each of these bichromate solutions was added .5 ml of 16 M. sulfuric acid, and .5 ml. of a saturated solution of diphenyl carbazide in 95% ethyl alcohol.

Readings were made against distilled water as a blank, and a straight line graph made of concentration against colorimeter readings. In the readings of the exhausted bath, a blank was made from a bath which was put through the "standard test" without bichromate. When no dilutions of exhaust bath were necessary to obtain readings on the colorimeter, this liquor was used as a blank. When dilutions were necessary, this liquor was mixed with distilled water proportional to the dilution, and used as a blank. When the dilutions were so great that the effect of the exhaust liquor was negligible, distilled water was used as a blank.

ELECTROMETRIC ANALYSIS

Established methods [10, 11] on the potentiometric titration of ferrous iron and bichromate were followed. The apparatus used was a Beckman potentiometer with platinum and saturated potassium chloride electrodes. N/100 and N/1000 ferrous ammonium sulfate solutions were prepared. N/100 and N/1000 potassium bichromate solutions were used to check the ferrous ammonium sulfate solutions. The measured portion of exhaust liquor tested was made up to approximately 100 ml. and 5 ml. of concentrated sulfuric acid added. This was then titrated against the ferrous ammonium sulfate until a rapid fall in potential occurred. A solution of N/10000 was tried, but did not give a good end point.

TABLE II
Analysis of Chrome Bath Calibration

Potassium Bichromate Grams Per Liter	*Colorimeter Readings*
0.0002	93
0.0004	179
0.0006	256
0.0008	332
0.001	415

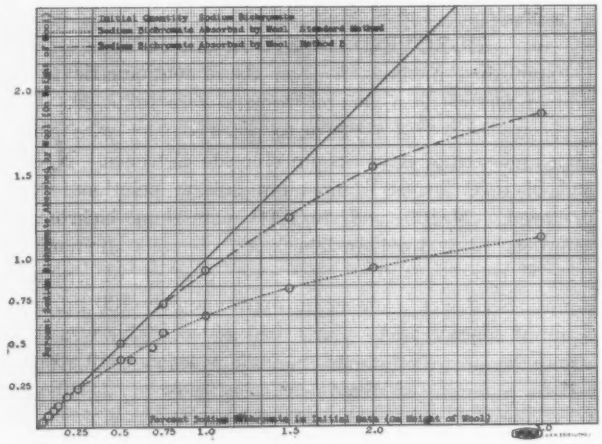
Amount Grams Sodium Bichromate in Initial Bath	*Grams Sodium Bichromate Absorbed by Wool*		*Per Cent Initial Sodium Bichromate Absorbed by Wool*	
	Colorimetric Method	*Electrometric Method*	*Colorimetric Method*	*Electrometric Method*
0.003	.00299+	...	100.0	...
0.006	.00599+	...	100.0	...
0.009	.00899+	...	100.0	...
0.012	.01199	...	99.9	...
0.018	.0178	...	99.0	...
0.024	.02345	...	93.5	...
0.05	.0429	.0395	85.8	79.0
0.055	.041	.0411	74.5	74.7
0.065	.048	.0469	75.5	72.2
0.075	.0585	.0537	75.0	71.5
0.1	.0675	.064	67.5	64.0
0.15	.0786	.0799	52.5	53.2
0.2	.096	.089	48.0	44.5
0.3	.113	.108	37.7	36.0
*0.05	.05	...	100.0	...
*0.075	.0741	...	99.0	...
*0.1	.0931	.0937	93.1	93.7
*0.15	.122	.124	81.3	82.6
*0.2	.159	.149	79.5	74.5
*0.3	.179	.189	59.6	63.0

See Graph I (average values).
*Applied by Method B.
All other tests applied by Standard Method.

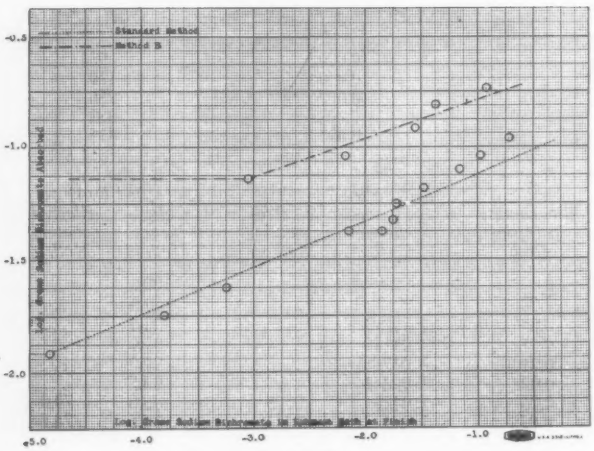
Using the "standard method," analyses were made to determine if there was any unreduced bichromate on the wool skeins. None was present below 0.25% bichromate. Above 0.25% bichromate gradually increasing amounts of unreduced bichromate were found. Analysis of exhausted dye baths showed no chromic ions to be present.

Graph I illustrates clearly that the quantity of bichromate taken up by the wool in a period of time is greater as the pH is lowered and the chrome concentration is increased.

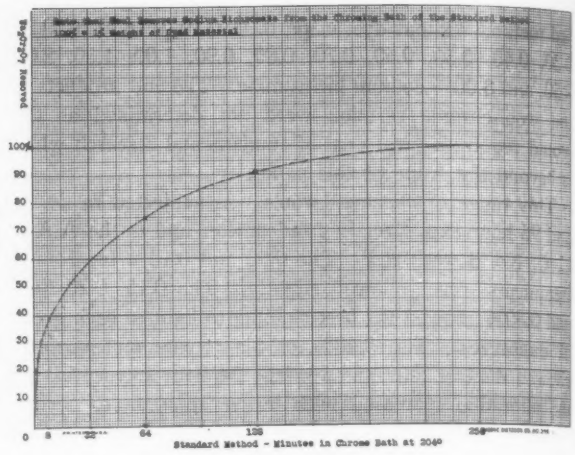
In Graph II, the logarithm of the bichromate absorbed is plotted against the logarithm of the concentration of



Graph I.



Graph II.



Graph III.

TABLE III
Data—Rate Absorbed by "Standard Method"

Time in Minutes	*Grams Sodium Bichromate Absorbed Colorimetric Method*	*Grams Sodium Bichromate Absorbed Electrometric Method*	*Grams Sodium Bichromate Absorbed Average*	*Per Cent Sodium Bichromate Absorbed*
1	.0198	.0226	.0212	21
2	.0223	.0272	.0249	25
4	.0305	.0306	.0306	31
8	.0317	.0348	.0333	33
16	.0401	.0457	.0429	43
32	.0626	.0636	.0631	63
64	.0737	.0767	.0752	75
128	.0909	.0916	.0913	91
256	.1			100

See Graph III.

TABLE IV

Color Index	
36	Calcochrome Yellow 2G
	Pontachrome Yellow GS
98	Calcochrome Brown RH
	Pontachrome Brown RH
101	Calcochrome Brown B
	Pontachrome Brown MW
180	Calcochrome Blue F4B
	Pontachrome Blue SW
202	Calcochrome Blue Black
	Pontachrome Blue Black R
216	Calcochrome Silk White Red B
	Pontachrome Red B
343	Calcochrome Yellow CGW
	Pontachrome Fast Yellow R
652	Calcochrome Red ECB
	Pontachrome Fast Red E
720	Calcochrome Brilliant Blue BBG
	Pontachrome Azure Blue B
1085	Alizarine Blue Black B
No C. I.	Calcochrome Green SW
	Pontachrome Green G

the exhaust bath. This shows a chemical reaction in smaller percentages and physical absorption in the higher percentages.

To determine the rate of absorption from the chrome bath of the "standard method" initially charged with 1% Sodium Bichromate, skeins were withdrawn at the time intervals listed in Table III and the baths analyzed in the manner previously described.

DYES-BICHROMATE

With these data collected the next step was to determine how dyes would behave with bichromate under controlled conditions. The colors chosen were selected as representative of fast, medium and slow chroming dyes.

The dyes listed in Table IV and others were studied for their reactions with chromic and bichromic salts. These experiments were made in the absence of wool.

One gram of each of the dyes tested was dissolved in a liter of water. One-six hundredths molal (1/600 M) solutions of chrome alum (potassium chromic sulfate) and sodium bichromate were prepared. This represents a concentration of one-half the weight of dye in the case of sodium bichromate. The chromic salt contains a chromium concentration equal to the bichromate salt. A solution of 2 ml. 56% acetic acid in one liter of water was also prepared. This was used to give approximately

the acidity of a dye bath using acetic acid (about 4.5 pH), neutralize any alkali in the dye, and prevent any possibility of chromic hydroxide precipitation. The temperature used was 205°F.

Ten ml. of the dye solution was acidified with 1 ml. of acetic acid solution and ten ml. of the chromic salt solution added. This was repeated using the bichromate solution in place of the chromic salt solution. The time for precipitation was observed and tabulated in Table V.

TABLE V

C.I.	*Chromic Sol. at 205° F.*	*Bichromate Sol. at 205° F.*
36	ppt. (2 min.)	clear solution (3 hrs.)
98	ppt. (3 min.)	cloudy (35 min.)
101	ppt. (instantly)	clear (end of 2 hrs.)
109	cloudy ppt. (2 min.)	clear (end of 1½ hrs.)
180	ppt. (40 min.)	clear (end of 2 hrs.)
201	ppt. (2 min.)	cloudy (end of 1 hr.)
202	ppt. (5 min.)	cloudy (end of 3 hrs.)
216	ppt. (30 min.)	no ppt. (end of 3 hrs.)
219	ppt. (5 min.)	clear (end of 2 hrs.)
299	ppt. (2 min.)	ppt. (45 min.)
343	ppt. (instantly)	ppt. (10 min.)
431	ppt. (7 min.)	clear (end of 1 hr.)
652	ppt. (5 min.)	clear (end of 3 hrs.)
720	ppt. (instantly)	ppt. (5 min.)
722	ppt. (20 min.)	clear (end of 3 hrs.)
1085	ppt. (2 min.)	clear (end of 1 hr.)
Pr. 4	ppt. (7 min.)	ppt. (1 hr.)
Calcochrome Green SW Pontachrome Green G	ppt. (50 min.)	ppt. (3 hrs.)

Some difficulty was experienced in distinguishing heavy colloidal solutions from cloudy precipitates. However, all the chromic dye combinations gave definite precipitates. In every case the dye precipitates with the chromic salt more quickly than with the bichromate. These data indicate that the chrome-dye complex is a chromic rather than bichromate compound. It is evident that most dyes require a reduction of the bichromate to the chromic state before the chrome-dye complex is formed. Dyes which required the longer periods of time for precipitation with the chromic salt, are those which in practice require long boiling periods and much higher percentages of bichromate. In this work these dyes were applied by Methods B and C.

THEORETICAL DYE-BICHROMATE QUANTITIES

The theoretical combination of 1 mol of dye to 1 mol of bichromate was used (except for C. I. 36 which requires 2 mols dye for 1 mol of bichromate) and the theoretical percentage of sodium bichromate required to react with dye as sold is tabulated in Table VI.

To determine the effect of different quantities of sodium bichromate, the dyeings in Table VII were made.

These were exposed in a fadeometer and subjected to the A.A.T.C.C. wash test No. 4. From these dyeings and test four experienced dyers independently selected the percentage of bichromate which gave the best results from the standpoint of shade, tinctorial value, fastness to light and washing. In a group of dyeings considered equal the lowest per cent of chrome is reported.

Insufficient bichromate results in inferior fastness due to some of the dye remaining as the acid dye. Over chroming, also results in dyeings which are duller, thinner and of inferior fastness.

The figures reported in the column designated "Final" show that very substantial reduction of bichromate are possible.

TABLE VI

Color	*% $Na_2Cr_2O_7.2H_2O$*
36	16.2
98	30.5
101	18.3
180	16.5
202	23.9
216	16.5
343	11.5
652	20.3
720	16.0
1085	18.3
Calcochr. Green SW } Pontachr. Green G }	28.4

TABLE VII

Per Cent Dye	*% Sodium Bichromate*
0.25	0.0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8
2.00	0.0, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0
3.00	0.0, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.5

100% = weight of dyed material

TABLE VIII

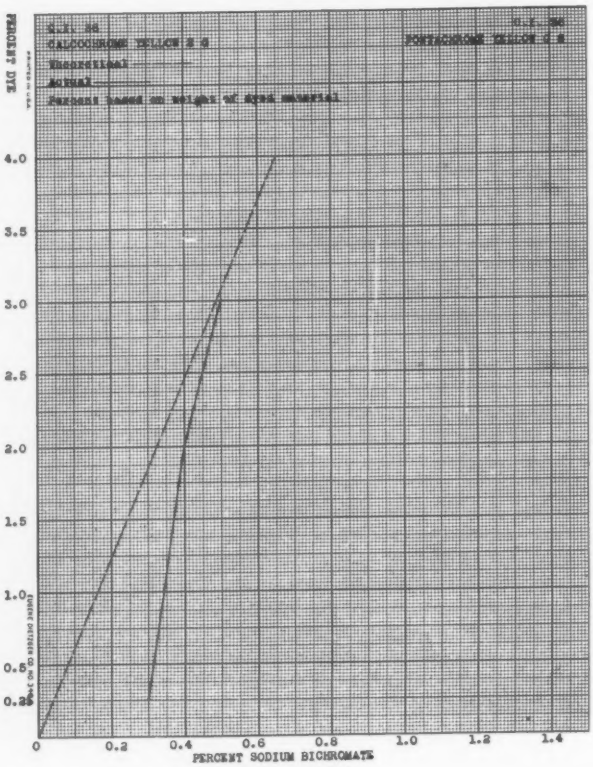
	0.25% Dye Observer & Selection					*2.00% Dye Observer & Selection*					*3.00% Dye Observer & Selection*				
Color	*A.*	*B.*	*C.*	*D.*	*Final*	*A.*	*B.*	*C.*	*D.*	*Final*	*A.*	*B.*	*C.*	*D.*	*Final*
CI 36	.3	.3	.3	.3	.3	.4	.4	.3	.4	.4	.5	.6	.5	.5	.5
98	.5	.3	.3	.3	.3	.4	.4	.3	.4	.4	.7	.7	.7	.6	.7
101	.2	.3	.2	.2	.2	.5	.4	.4	.5	.4	.6	.6	.5	.6	.6
202	.2	.2	.2	.3	.2	.3	.5	.3	.3	.3	.5	.4	.4	.4	.4
343	.2	.3	.3	.4	.3	.3	.3	.3	.3	.3	.5	.5	.5	.6	.5
652	.3	.3	.3	.2	.3	.4	.5	.4	.5	.4	.5	.5	.5	.7	.5
720	.3	.3	.4	.3	.3	.4	.4	.5	.3	.4	.6	.6	.5	.6	.6
1085	.3	.4	.3	.3	.3	.4	.4	.5	.4	.4	.6	.6	.7	.6	.6

Graphs 4 to 11 give the theoretical and actual quantities of Sodium Bichromate required.

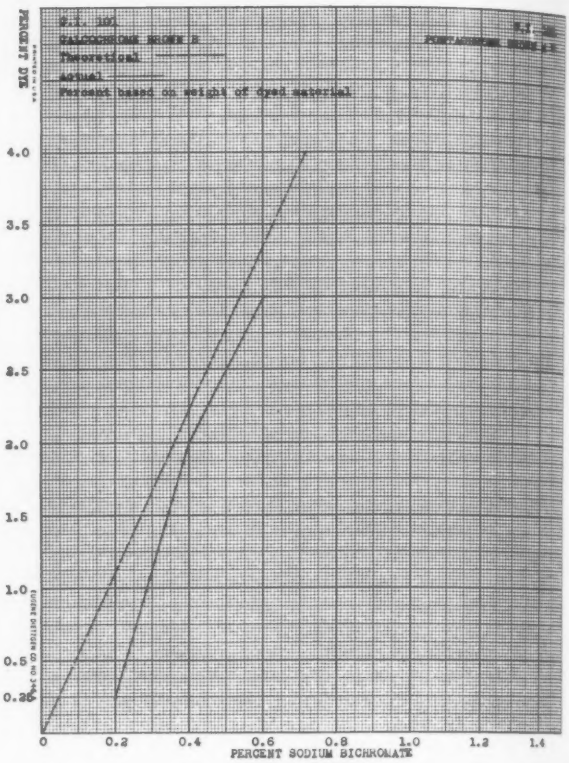
SPECTROPHOTOMETRIC ANALYSIS

The ¼% dyeings of 11 dyes were measured on a modified General Electric spectrophotometer and the data interpreted analytically.

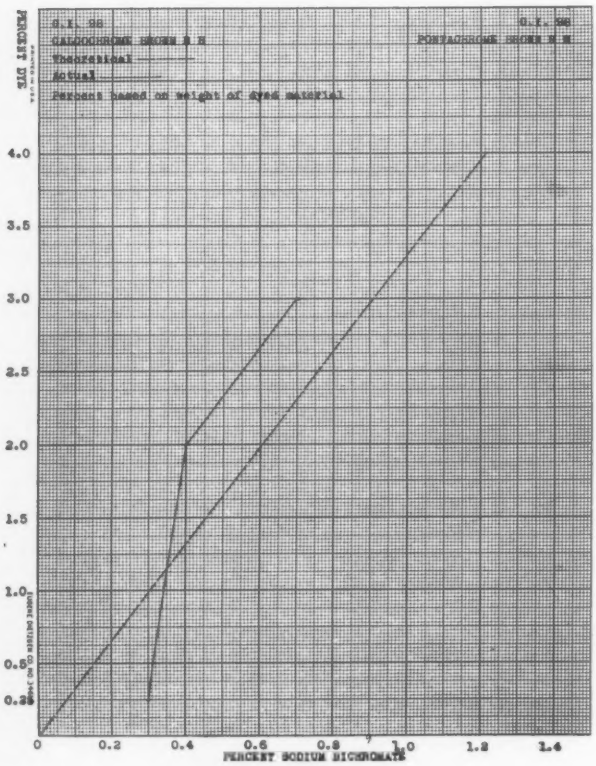
Graph XII presents the results of the analysis for per cent of dye which has been metallized plotted versus the amount of chrome used in dyeing for three dyes which are typical of all the data. The amount of chrome needed varies from 0.1% for C. I. 343 to 0.8% or more for C. I. 180. The points where the curves level off indicating that chromation is complete is difficult to determine because the curves are asymptotic. Since 95% chromation probably represents sufficient chromation commercially, and since this value is more easily determined from the type of curve shown in Graph XII, these values are tabulated in Table



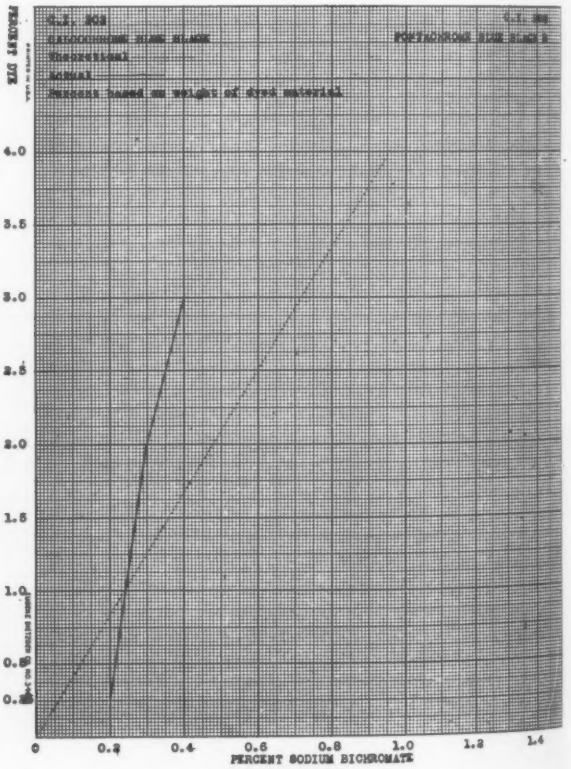
Graph IV.



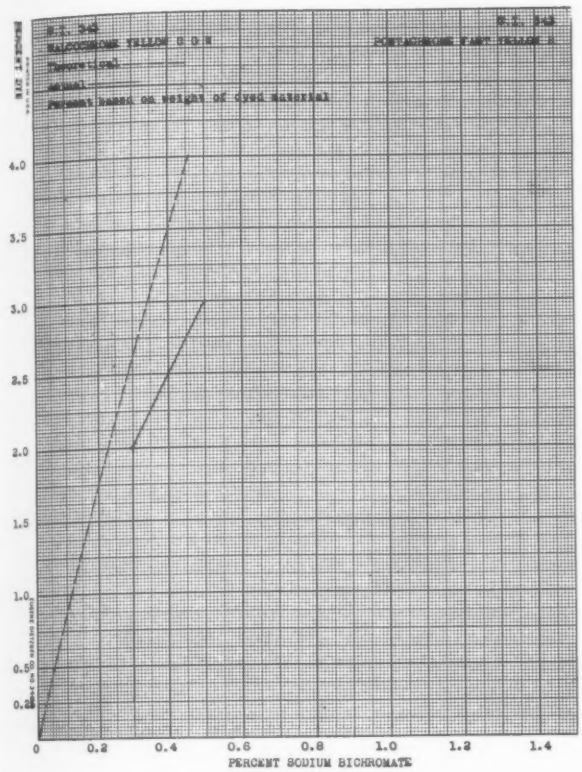
Graph VI.



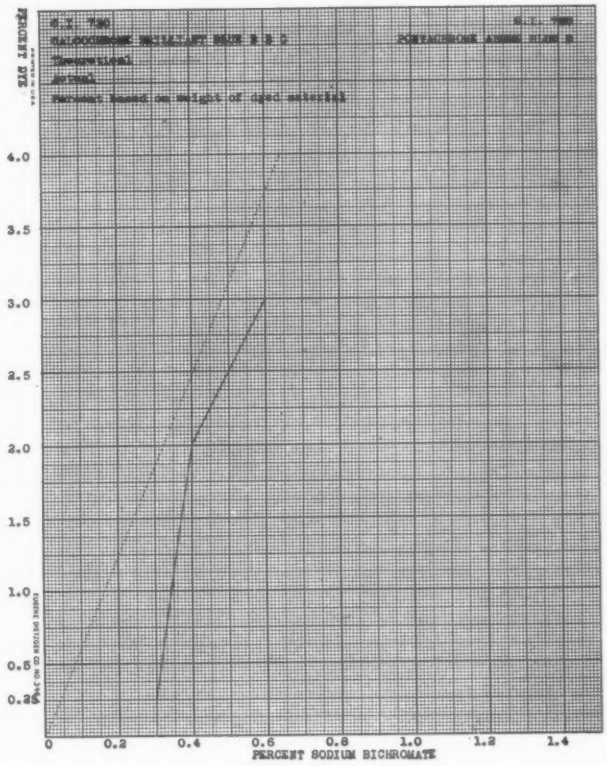
Graph V.



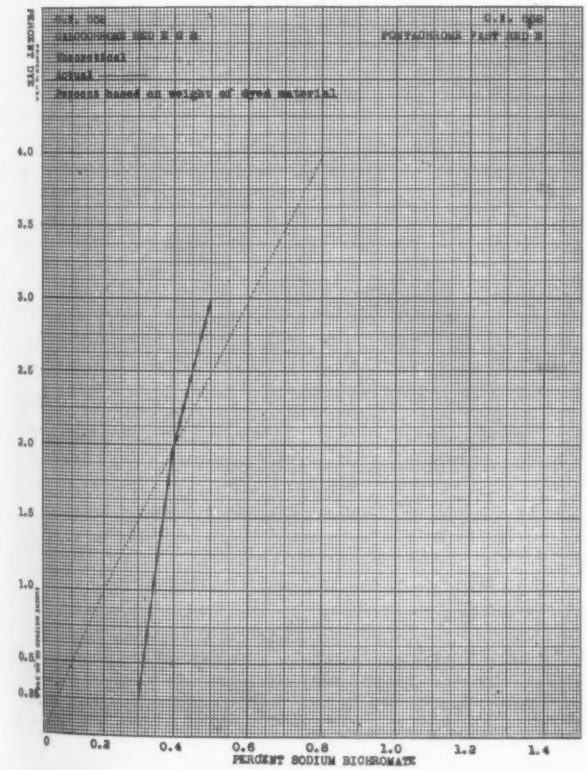
Graph VII.



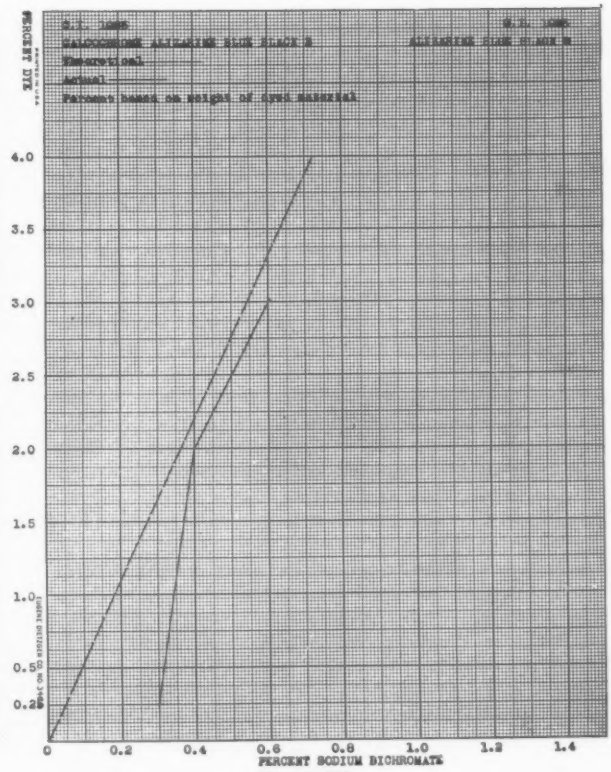
Graph VIII.



Graph X.

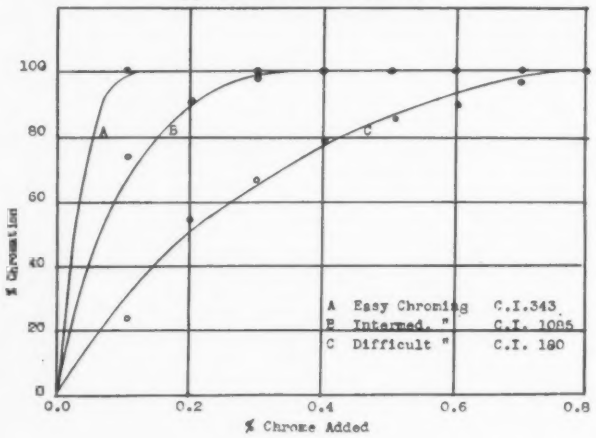


Graph IX.



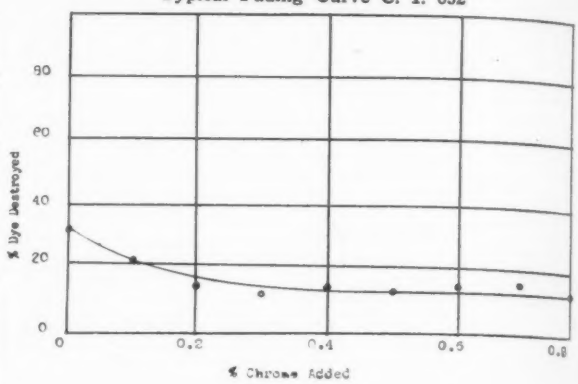
Graph XI.

Typical Chromation Curves



Graph XII

Typical Fading Curve C. I. 652



Graph XIII.

IX. This figure corresponds in general to the minimum amount of chrome chosen visually on the basis of wash tests and shade development because the slight difference in light and wash fastness introduced by the remaining 5% of unchromed dye would be negligible.

Graph XIII presents typical results of the analysis for per cent dye destroyed by light, calculated regardless of whether the dye was present in the acid or metallized form. This is plotted versus the amount of chrome used in dyeing. In general the acid dyeings are more fugitive than the chrome dyeings and thus the fastness increases with chromation. However, the minimum chrome needed to insure good light fastness occurs at a lower figure than complete chromation because, as in the visual testing, the small amount of more fugitive acid dye does not significantly detract from the fastness. Table IX presents the points where the fading curves level off indicating the minimum amount of chrome giving satisfactory light fastness.

TABLE IX
Minimum Chrome

C.I.	For 95% Chromation	For Satisfactory Light Fastness
36	0.3	0.3
98	0.3	0.2
101	0.2	0.1
180	0.7	0.7
202	0.4	0.1
216	0.3	0.1
343	0.1	0.3
652	0.4	0.3
720	0.7	0.05
1085	0.3	0.1
Green SW	0.5	0.2

There was a notable destruction of dye in the case of C. I. 202, the sample with 0.8% chrome having only 75% as much dye as the 0 chrome dyeing. This calculation was made without regard to whether the dye was in the acid or metallized form. There was also some destruction in the case of C. I. 652, the 0.8% sample being 90%.

In general some free chrome was observed on the wool even on samples where the dye was not completely chromed. A comparison of the visual and spectrophotometric results shows good agreement in all cases where both tests were made except for C. I. 720. Visually it appears that this dye is easily chromed and the change in color with added amounts of chrome in the bath above a figure of about 0.4% is attributed to free chrome on the wool. Spectrophotometrically it appears that a further change in color, not attributable to added free chrome but only explainable by a further change in the dye molecule occurs until as much as 0.8% chrome is used.

The analysis of colored material on the fiber was accomplished by considering the observed color in each case to be the resultant of the independent absorption of light by four components as follows: the wool, the dichromate, the unchanged dye and the chromed dye. The wool standard curve was a measurement of a sample which had been put through the dyeing process but using no dye and no chrome. The dichromate standard curve was a measurement of a sample of undyed wool to which 1% dichromate had been added in a regular dyeing procedure. In the calculations it was assumed any free chrome present on the dyed fabric was the same color as the chrome in this standard. The unchanged dye curve was the straight acid dyeing with no chrome added. The chromed dye curve was the measurement of the sample with the largest amount of chrome, corrected for the color of any free chrome present. It was assumed in the calculations that only the one metallized complex, namely that present in the sample with the highest amount of chrome, was present in any of the intermediate dyeings.

With the above assumptions a mathematical analysis along the lines first suggested by Weigert[12], was carried out.

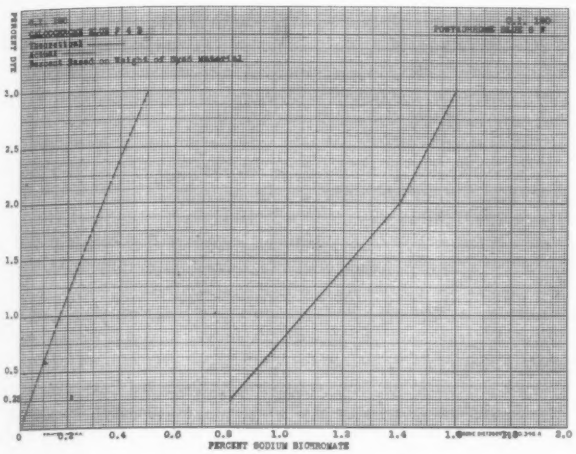
SILK WHITE DYES

C. I. 180, 216, and Silk White Green known generally as "silk white dyes" are immobile or slow chroming dyes. The fastness tests indicated that they are not properly chromed by the "standard method." As the general use

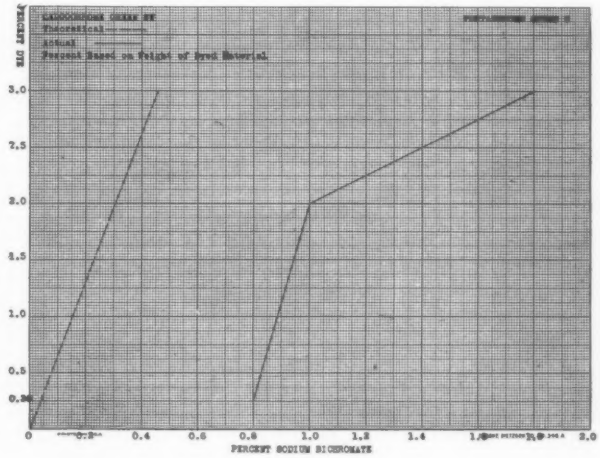
TABLE X

Color	0.25% Dye Observer & Selection A.	B.	C.	D.	Final	2.00% Dye Observer & Selection A.	B.	C.	D.	Final	3.00% Dye Observer & Selection A.	B.	C.	D.	Final
CI 180	.8	.8	.8	.8	.8	1.6	1.4	1.4	1.4	1.4	1.6	2.	2.	1.6	1.6
216	.5	.6	.6	.6	.6	2.	2.	2.	1.8	2.	2.	2.	2.	2.	2.
Green SW	.8	.8	.8	.8	.8	1.	1.	1.	1.2	1.	1.8	1.8	1.6	2.	1.8

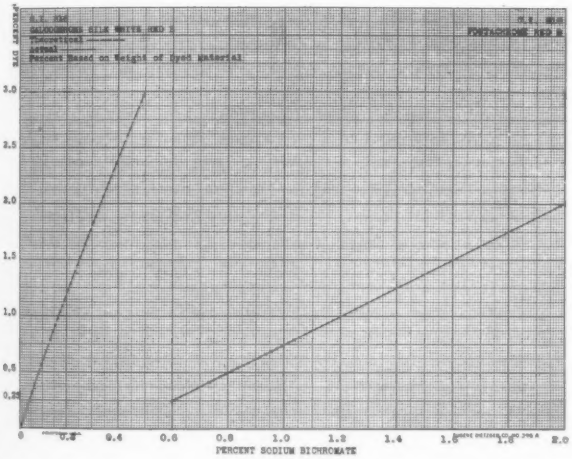
Graphs 14 to 16 give theoretical and actual quantity Sodium Bichromate required by these dyes.



Graph XIV.



Graph XVI.



Graph XV.

of this group of dyes is for silk effect, Method B was used for 2 and 3% of dye and Method C for 0.25% dye. The dyeings were subjected to the same tests and submitted to the same observers for interpretation. Results are reported in Table X.

These dyes are a specialty group comprising about 5% of the chrome dyes used.

PLANT APPLICATION

From the theoretical and experimental standpoint good agreement has been shown. The textile plants cooperating in this work then sought to establish the practicability of these findings. To date several million pounds of shades for both Government and civilian goods, including wools, mohair and worsted top have been dyed with success. Comparative tests on old and new methods were checked for dyeing results and fastness. No loss but rather some improvements have been noted. A few of the mill formulas are shown here.

U. S. AVIATION CLOTH
Blend—50% Foreign—50% Domestic—Part Carbonized
Quality—56s
Shade Blend of Equal Parts—Yellow, Green and Brown
Formula for 400 lbs. Material

Dye	Yellow	Green	Brown
C.I. 343	27.0 ozs.	51.0 ozs.	51.0 ozs.
Pr. 14	3.4 ozs.	11.7 ozs.	14.0 ozs.
Pr. 2	5.4 ozs.	8.65 ozs.	43.0 ozs.
C.I. 1085	12.5 ozs.	36.0 ozs.	25.0 ozs.
Glaubersalt	40 lbs.	40 lbs.	40 lbs.
Ammonium Sulfate	20 lbs.	20 lbs.	20 lbs.
	Enter 120° F.		
	Raise to 208° F.		
Acetic Acid 70%.	5 lbs.	5 lbs.	5 lbs.
	15 minutes		
Acetic Acid 70%.	5 lbs.	5 lbs.	5 lbs.
	15 minutes		
Formic Acid	....	5 lbs.	5 lbs.
	15 minutes		
Sodium Bichromate	18 ozs.	20 ozs.	24 ozs.
	30 minutes		

U. S. 32 OZ. MELTON OVERCOATING
Blend —100% Domestic—Part Carbonized
Quality—44s or better
Formula for 400 lbs.

Dye	Green	Brown
C.I. 343	90.0 ozs.	88.0 ozs.

Dye	Green	Brown
Pr. 14	6.7 ozs.	24.0 ozs.
Pr. 2	18.3 ozs.	53.4 ozs.
C.I. 1085	63.0 ozs.	29.4 ozs.
Glaubersalt	40 lbs.	40 ibs.
Ammonium Sulfate	20 lbs.	20 lbs.
	Enter 120° F.	
	Raise to 208° F.—15 minutes	
Acetic Acid 70%	4 lbs.	4 lbs.
	15 minutes	
Acetic Acid 70%	4 lbs.	4 lbs.
	15 minutes	
Formic Acid	4 lbs.	4 lbs.
	15 minutes	
Sodium Bichromate	32.0 ozs.	34.0 ozs.
	30 minutes	
	Shade blended as follows:	
	40% O. D. Clips	
	10% Blanket Thread Waste	
	25% Green	
	7% Brown	
	18% White	

ARMY AND NAVY BLANKETS

Quality—56s
Formula for 400 lbs.

Dye	A	B	C
C.I. 343	66.0 ozs.	60.0 ozs.	...
C.I. 98	11.0 ozs.	11.7 ozs.	...
Pr. 4	8.0 ozs.	...	...
C.I. 202	10.5 ozs.	23.0 ozs.	220.0 ozs.
C.I. 203	...	...	220.0 ozs.
C.I. 1085	10.5 ozs.	...	...
Glaubersalt	40 lbs.	...	...
Ammonium Sulfate	20 lbs.	20 lbs.	...
	Enter 120° F.		
	Raise to 208° F.		
	15 minutes		
Acetic Acid 70%	5 lbs.	5 lbs.	5 lbs.
	15 minutes		
Acetic Acid 70%	5 lbs.	10 lbs.	5 lbs.
	15 minutes		
Acetic Acid 70%	..	10 lbs.	..
	15 minutes		
Formic Acid	5 lbs.	..	5 lbs.
	15 minutes		
Sodium Bichromate	24 ozs.	22 ozs.	60 ozs.
	30 minutes		

A and B.....U. S. Army Blankets
C .....U. S. Navy Blankets

U. S. NAVY

Quality—56s
Shade—No. 7 Olive Drab
Formula for 400 lbs. Material

Dye	
C. I. 343	7.0 ozs.
Omega Chrome Brown RLL	26.6 ozs.
Monochrome Black Blue G.	25.8 ozs.
Ammonium Sulfate	20 lbs.
Enter 120° F.	
Raise to 208° F.	
208° F.—15 minuptes	
Acetic Acid 70%	5 lbs.
208° F.—15 minutes	
Sodium Bichromate	16.0 ozs.
208° F.—45 minutes	

CAMEL SHADES

400 lbs. Fine Wool

Dye	A	B	C
Pr. 14	2.75 ozs.	10.0 ozs.	1.125 ozs.
C. I. 98	2.00 ozs.	...	3.50 ozs.
C. I. 52	1.375 ozs.	...	...
C. I. 40	1.125 ozs.	...	1.125 ozs.
1085	1.125 ozs.	...	.075 ozs.

Dye	A	B	C
Acetic Acid 56%	6 lbs.	6 lbs.	6 lbs.
	Enter 120° F.		
	Raise to 204° F.		
	204° F.—30 minutes		
Acetic Acid 56%	6 lbs.	6 lbs.	6 lbs.
	204° F.—30 minutes		
Sodium Bichromate	8.0 ozs.	8.0 ozs.	8.0 ozs
	204° F.—30 minutes		

FINE WOOL—400 LBS.

Dye	Light Brown	Medium Brown	Light Navy	Navy Dark
Pr. 14	23.75 ozs.	27.00 ozs.	....	.....
C. I. 36	7.75 ozs.	8.00 ozs.	....	....
C. I. 98	22.00 ozs.	26.00 ozs.	....	....
C. I. 202	....	....	96.00 ozs.	272.00 ozs.
C. I. 652	....	....	40.00 ozs.	12.00 ozs.
C. I. 720	....	....	48.00 ozs.	....
Glaubersalt	20 lbs.	20 lbs.	20 lbs.	20 lbs.
	Enter 120° F.			
	Raise to 208°			
	208° F.—30 minutes			
Acetic Acid 56%	....	....	10 lbs.	10 lbs.
	208° F.—30 minutes			
Acetic Acid 56%	....	....	10 lbs.	10 lbs.
	208° F.—30 minutes			
Formic Acid.	2 lbs.	2 lbs.	4 lbs.	4 lbs.
	208° F.—30 minutes			
Sod. Bichromate.	14 ozs.	14 ozs.	46 ozs.	46 ozs.
	208° F.—30 minutes			

DYEING OF SLUBBING IN ABBOT MACHINES

Formulas for 100 Lbs. Material

Dye & Chemical	6 Brown—50s	926 Blue—50s	366 Blue—50s
Glaubersalt	....	10 lbs.	....
Ammonium Sulfate	....	....	6 lbs.
Acetic Acid 70%	1 lb.	1 lb.	....
	120° F.—5 minutes		
Pr. 2	1.60 ozs.	....	....
C. I. 98	5.60 ozs.	....	....
C. I. 202	2.80 ozs.	10.00 ozs.	....
C. I. 343	30.00 ozs.	....	....
C. I. 652	....	1.20 ozs.	1.00 ozs.
C. I. 720	....	10.00 ozs.	25.10 ozs.
	120° F.—5 minutes		
	Raise to 208° F.		
	208° F.—15 minutes		
Acetic Acid 70%	1 lb.	1 lb.	1 lb
	208° F.—15 minutes		
Acetic Acid 70%	....	....	2 lbs.
	208° F.—15 minutes		
	208° F.—15 minutes		
Formic Acid	1 lb.	1 lb.	1 lb.
	208° F.—15 minutes		
Sodium Bichromate	8.00 ozs.	5.30 ozs.	5.3 ozs.
	208° F.—30 minutes		

SUMMARY

The amount of bichromate absorbed by the wool is a function of pH, total acidity, concentration of bichromate and time. The amount of bichromate taken up follows an absorption isotherm. At low percentages, where the bichromate is quantitatively absorbed, it is completely reduced. At higher absorptions there is a mixture of reduced and unreduced bichromate. The main reaction with the dye is with the chromic salt.

(Concluded on page P512)

Intersectional Contest— ★ **Second Prize Winner** ★

New Proposed
STANDARDS FOR LIGHT FASTNESS

Presented for the Northern New England Section

by HUGH CHRISTISON

Arlington Mills

COMMITTEE

Hugh Christison, Chairman, Arlington Mills.
Roland Derby, Textile Aniline and Chemical Co.
Bertil A. Ryberg, A.A.T.C.C.
Mitchell Glowienski, Arlington Mills.

THE idea of light fastness standards is not new, and has been the object of work of many, both here and abroad. The present tendency toward standardization and consumer information has made either a standard fading unit or standards of fading increasingly important. A standard fading unit is probably the more desirable, but the complexity of lamp design, variation in electric current, temperature, humidity control, and other factors, will have to be solved before such a unit can be accepted as the primary standard. The electric arc fading lamp has been so useful that it is here to stay. Satisfactory standards to accompany these lamps are recognized as important.

Since most light fading experienced by the consumer is caused by sun or daylight, standards of varying fastness to light fading are desirable for comparison with sun or daylight effects.

The German and Swiss dye industry probably were the first to use dye fastness standards, grading their own products in steps, sometimes from one to eight. With the advent of the A.A.T.C.C. research program, we entered the field of light fastness in all its phases. The value of the work of William H. Cady and William D. Appel, who labored hardest, can hardly be over-estimated. Their ideal was, and is, a satisfactory international set of standards. It is with hesitancy that the proposed standards are presented in view of the work done and the practically international scope of the acceptance of the present dyeings described in our Year Book. Only at the insistence of other members is this scheme presented. The results of the idea are not perfect and are subject to just criticism., but some believe the suggested standards represent an improvement over the old. The idea is that, instead of a different dye for each standard, only two dyes and two dyeings be used.

The first work along this line was to mix in the dye bath, the two dyes, in varying proportions, to obtain the different steps of fastness wanted. The results looked interesting, but were considered unusable because the fastest known chrome or acid dye for light fastness would not equal the fastness of vat dyes or the vat leuco esters. It is true that vat dyeings are topped or bottomed with other colors, and it is theoretically possible to produce five or eight dyeings of equal number fastness steps in this way. This was tried and abandoned for the more easily controlled and reproducible proposal here presented.

Our idea is to make two separate slub dye wool dyeings, one fugitive, the other fast, and blend them mechanically in proportions to produce the wanted fastness steps. One of the desirable characteristics of standard light fastness dyeings is that they should be fast to water and washing, because samples left on the roof are subjected to rain and snow, and because of soot and dirt, it may be desirable to wash them. The present standards are somewhat deficient in this respect. Another desirable (though controversial) point is that the dyeing should lose color without change of hue. This last perhaps no dyeing does perfectly, although Erio Chrome Azurole B, .4 per cent, which was chosen for the fugitive component, behaves quite well, and is, of course, quite fast to washing. The fast component was dyed using Algosol Blue AGG or Indigosol Blue AGG, 3%.

The combinations were made using algebraic percentage changes in the ratio of the two components. First, pads were made by first carding the two components for the pad material; six sets of these mats were sent to dye manufacturers, mill and school laboratories, for fading. Guided by these results, yarn was made from the blended components and sample cloth woven and finished. The cloth samples in turn have been distributed for fading and the results mounted for inspection.

We claim for the proposal the advantages of:

1. Good reproducibility.
2. Simplicity (two dyes and two dyeings).
3. Good fastness to water and washing.
4. Gradual small change in hue from one standard to the next.
5. Fairly good loss without much change of hue, on fading.
6. The method used to dye the wool, blend, and make the cloth standards, represents ordinary mill trade procedure.
7. Exact and readily controlled steps of fastness in any number wanted.

8. Small change in hue of dyeings in natural compared with lamp light.

Disadvantages of the proposal are that,

1. No laboratory known can make the proposed standards, this being mill work.
2. There is a tendency of the dyeings to fade to a mixy appearance, which is hardly noticeable except on over fading.

This work has only been possible through the help of friends, especially Bertil A. Ryberg, and the work of my associate, Mitchell Glowienski. The preliminary work and original concept are those of Miss Katherine Frederick.

• CALENDAR • OF COMING EVENTS

Meeting, Rhode Island Section, November 26, 1943.

Meeting, Southeastern Section, Atlanta Athletic Club, Atlanta, Ga., November 27, 1943. (Note change in date from December 4.) Speaker: J. Andrew Clark, Sylvania Industrial Corp., "Ceglin."

Meeting, New York Section, Downtown Athletic Club, 19 West Street, New York City, December 3, 1943. Subject: "Research and Development of Textile Fabrics for Victory." Speakers: Rear Admiral W. J. Carter, Asst. Chief, Bureau of Supplies and Accounts, Navy Dept., Washington, D. C.; Colonel Elsmere J. Walters, Executive Officer, Quartermaster Depot, Philadelphia, Pa.

Meeting, Philadelphia Section, Hotel Philadelphian, Philadelphia, Pa., December 10, 1943.

Minimum Chrome

(Concluded from page P510)

Dyes have individual characteristics which must be determined. Under a given set of conditions, dyes which are chromable can be measured as to the amount of chroming attained. This has been substantiated by correlating the fastness tests, shades and spectrophotometric readings. Visual and spectrophotometric methods are outlined for determining the optimum amount of bichromate for individual dyes.

The normal chrome dyes tend to follow the amounts of bichromate predicted theoretically for them. The amount of bichromate necessary for optimum results for normal chrome dyes is one-half that used in practice today.

As shown in practical dyeings satisfactory results were obtained using 0.125 to 0.3% bichromate for 0.25% of dye or less based on the weight of the wool. For amounts of dye more than 0.25% the amount of bichromate should be one-quarter of the amount of dye but greater than the quantity used for 0.25% of dye.

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Intersectional Contest— ★ **Third Prize Winner** ★

A Study of Textile Fibers and Fabric Construction as Factors Influencing Adhesion of TEXTILE-PLASTIC COMBINATIONS

Presented for the New York Section

by CARL W. PATTON

Plastics Division, Carbide and Carbon Chemicals Corp.

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INTRODUCTION

TEXTILE-PLASTIC combinations are being produced in large volume to aid the war effort. The variety of types and uses for textiles coated with plastics, or textiles laminated with plastics, is illustrated by representative products such as, raincoats, ponchos, water and food bags, life-saving vests, gas-proof clothing, aircraft paulins, light weight tents for mountain troops, upholstery material for motorized equipment, and binocular covers. The large scale manufacture of relatively new synthetic plastics has contributed greatly to the expanded production of these types of products.

There is every reason to believe that the volume and variety of textile-plastic combinations for civilian use will be large and continue to increase in the future. The present and potentially large consumption of fabrics involved is of extreme interest to the textile industry, especially so in its present greatly expanded condition.

Plastic manufacturers and companies applying plastic compounds to fabrics have accumulated data on choice of plastic compounds and modes of application to fabrics. Quite possibly there are specialists in the field who have in the course of manufacturing operations collected a certain amount of practical experience concerning the choice of suitable fabrics for use in combination with plastics. On the whole, however, there has been a dearth of pertinent scientific data to guide the textile manufacturers and finishers either in selecting, developing, or preparing fabrics specifically for use in textile-plastic combinations.

The consensus of the N. Y. Section Intersectional Contest Paper Committee of the AATCC was that these conditions, i.e., volume of fabrics involved and lack of published information on those fabric properties which affect textile-plastic combinations, amply justified the Committee's originating and conducting an investigation of this field to obtain information of scientific and practical value to the textile industry.

It is desirable from a scientific view-point to first consider the basic factors involved in the production of textile and plastic combinations. For example, when considered separately, a properly designed fabric may appear ideal for a certain application and, likewise, the plastic compound involved may appear entirely suitable. However, the end product is not complete until a satisfactory union of the two is effected. Therefore, suitable adhesion of the textile and plastic would appear to be an important item in the manufacture of such combinations.

The trade which applies plastics to textiles is well aware of the many complexities which influence adhesion, such as, type of plastic, degree and type of both pigmentation and plasticization, and mode of application. This latter oftimes greatly influences degree of penetration which in turn is considered an important consideration in obtaining adequate adhesion without excessive stiffening of the base fabric or fabrics.

The importance of the adhesion factor, uncertainty experienced in obtaining adequate adhesion, and lack of information concerning the influence of type of fibre and fabric construction on adhesion strength, was confirmed by the Committee's contacts with the textile coating and laminating industry. Hence the Committee's choice of this particular phase for investigation. This was further subdivided into two general phases, i.e., development of experimental procedures and application of these to a study of the adhesion question.

DEVELOPMENT OF PROCEDURES FOR PREPARING AND TESTING SAMPLES

It was apparent from the beginning that even a modestly extensive investigation would involve a fair number of fabrics, plastics, combining conditions, and multiple samples. The latter because adhesion tests in the past have not been closely duplicated. It was estimated that at least 3,000 to 4,000 specimens would have to be prepared and tested.

This indicated that not only would a rapid test method be necessary but a simple method for rapid preparation of test samples would have to be developed. Making small scale factory runs by calender-coating, spreader coating, or roll-lamination was out of the question not only because of the time involved but because it was not possible under present-day conditions to obtain either the relatively large total amount of textiles and plastics required, or the use of equipment urgently needed for production of war materials. Possibly of more importance from a scientific view-point is the difficulty of accurately controlling and measuring variables when commercial production equipment is used for experimental purposes.

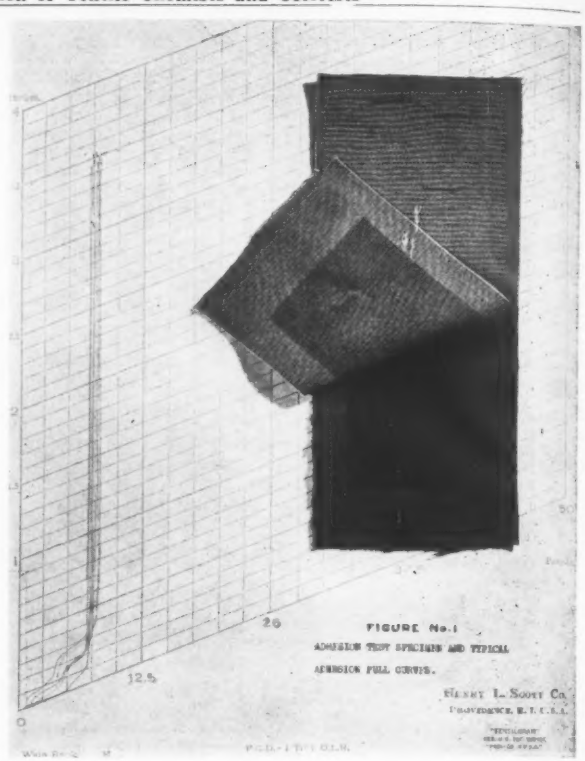
Since calender-coating and roll lamination are both commercial processes involving application of plastics by heat and pressure, and since both commercial and experimental plastic compounds could be obtained in the form of thin flexible sheets or rolls, it appeared that lamination of test specimens in some type of hot press would bear a desirable relation to commercial processing and would also facilitate control and recording of experimental conditions.

Shirt and related laundry type presses were found to be of difficult control. Hydraulic plastic-molding presses were difficult to control at low pressures and were relatively slow-acting. Fused collar presses were located which had accurate time, temperature, and pressure controls and could be operated rapidly by compressed air. Preliminary test laminations were made, 1" wide specimens were cut out, and strength of bond determined by pulling the laminated fabrics apart in a Scott Tester. Total bond strength appeared too low for accurate measurement and stray yarns contributed to erratic results.

A 2" x 6" x .008" piece of plastic compound, placed against the crease on the inside of a 3" x 14" strip of fabric, folded to 3" x 7" dimension, as shown in figure 1, was finally adopted for preparation of test specimens.

This placed identical fabric surfaces in contact with the plastic compound, tended to eliminate differences in force required to remove the plastic compound which might have been encountered in pulling directly on strips of plastic compounds of varying extensibility and tensile strength laminated to the fabric; the excess of fabric on each edge eliminated erratic effects of stray yarns which were almost unavoidable if specimens were cut to exact width after lamination, and the one-inch over-lap facilitated fastening the specimen in the testing machine. Moreover, the fabric being in one piece facilitated subsequent inspection of the two surfaces involved in any given pull test. Since the test was a measure of adhesion of fabric to plastic, the results should be applicable in the case of coated, as well as laminated, combinations.

The tension, as a given sample was pulled apart, was desirably uniform as illustrated by the typical adhesion test curves shown in figure 1—which were obtained with the recording apparatus on a Scott Testing Machine. Full



details on adhesion test procedure are given in Appendix (A).

Statistical analysis of a number of duplicate specimens indicated that 10 specimens for each individual test provided an average result accurate to the nearest ½ pound, hence all figures given are on this basis.

In order to reduce to a reasonably finite number the infinite number of time-temperature-pressure combinations possible in a study of this type, a preliminary survey was made with a limited number of textile-plastic combinations over a wide range of conditions. It appeared that temperature was a primary factor in its effect on adhesion, and that time and pressure were of minor importance. For example, if a given combination could not be effected at 225° F. using 25 lbs./sq. in. pressure for 30 seconds, then very little improvement was obtained by increasing the pressure to 100 lbs./sq. in. and holding it for several minutes at the same temperature. However, a rise in temperature effected a much greater improvement in adhesion even when lower pressure was used for the shorter period of time. Finally, conditions were chosen as follows:

TIME—30 Seconds. This short period of time was used to expedite preparation of samples, to prevent excessive penetration of the plastic compound into the fabric, and to approximate calender or roll-laminating contact time as closely as practical.

PRESSURE—75 lbs./sq. in. While most of the compounds adhered satisfactorily at lower pressures when suffi-

cient temperature was used, some of the higher softening-temperature materials exhibited slightly improved adhesion with the higher pressure. Hence this pressure was used because it produced the most uniform results with all the plastic compounds.

TEMPERATURES—225, 275, and 325° F. This was about the maximum range feasible with steam-heated press jaws. Several temperatures were required in order to locate temperatures for the various combinations at which maximum strength and uniformity of bonds were secured. As shown in Table 1, which is typical of the results obtained, the adhesion of a given lamination was fair at 225° F., only slightly improved at 275° F., and actually decreased when prepared at 325° F. Inspection of test specimens showed that the latter was primarily due to the plastic compound becoming excessively fluid and dissipating into the fabric, thus leaving insufficient bonding material between the two layers of fabric. This excessive penetration also increased the stiffness of the fabric. Some of the compounds tested developed maximum adhesion at 325° F. Hence it is not known definitely what temperature, if any, will cause them to penetrate excessively. In general, adhesion values fluctuated considerably when obtained on repeat samples laminated at temperatures appreciably below or above the temperature giving maximum adhesion values with a given plastic.

Full details on the lamination equipment and procedure are given in Appendix A.

INVESTIGATION OF EFFECT OF FIBER AND FABRIC CONSTRUCTION ON ADHESION

Selection of Textiles and Plastic Compounds for Testing

Careful consideration was given to the selection of test textiles to include various types of available fibers such as cotton, wool, mohair, viscose and acetate rayon, the latter of both spun and continuous filament types. Weaves, ranging from basket through poplins, twills and even corduroy and woolen flannels, were selected. Both unfinished and variously finished samples of the same basic textile were obtained in a number of instances. Care was also taken to include numerous fabrics that would be of interest in their final coated or laminated form.

Complete test data were obtained on all the original fabrics so as to furnish data in studying the subsequent combinations. Photographs, magnification x 8, were made with both transmitted and reflected light. Photos made by reflected light were selected in preference to those made by transmitted light because the former more clearly revealed the fabric structure.

The complete data and photographs by reflected light are presented in Appendix C.

Representative plastic compounds were selected from the group of plastics currently used for coating and lamination of textiles. These included thermoplastic and thermosetting vinyl butyral resin compounds, cellulose acetate collar interliner material, and a range of thermoplastic vinyl chloride-acetate resin compounds. Code numbers and chemical data on these are given in Appendix B.

TABLE 1

Average Results of Adhesion Strength Tests on Plastic No. 1 (Plasticized Vinyl Chloride—Acetate Resin) (Expressed in Pounds Pull)

Fabric Code Number	*Laminating Temp. 225°F*	*Laminating Temp. 275°F.*	*Laminating Temp. 325°F*
1	11.6	13.4	Excessive Penetration
2	10.0	10.5	Excessive Penetration
3	4.0	Excessive Penetration	Excessive Penetration
4	6.0	18.8	5.7
4A	6.2	17.5	4.6
5	4.7	12.2	3.0
5A	5.6	15.3	2.5
6	4.3	14.5	6.6
6A	3.7	14.2	3.8
7	3.7	11.3	7.2
7A	2.4	9.7	6.8
7B	1.8	10.7	7.1
8	7.8	20.0	4.9
8A	8.5	19.9	3.6
9	1.8	4.8	4.8
9A	1.8	4.7	4.9
10	0.8	3.1	4.4
10A	0.7	4.2	4.6
11	18.4	18.9	5.2
12	4.7	8.3	Excessive Penetration

Note: This table also shown in Appendix D.

TESTS PERFORMED

Test laminations and adhesion determinations were made on the entire group of textiles and plastic compounds in accordance with the previously described procedures.

The data on the adhesion tests, which are the averages in pounds pull of 10 tests on 10 duplicate specimens, are given in detail in Appendix D.

ANALYSIS OF DATA AND RESULTS OF INVESTIGATION

The analysis of data is aided by arranging them graphically on Chart No. 1. Position of points on the vertical scale represents the pounds pull necessary to de-laminate the textile-plastic combinations. These values are the average maximum figures obtained with each fabric and plastic at the various lamination temperatures shown in Appendix D.

The fabrics are arranged left to right on the horizontal axis according to adhesion values obtained with all plastics. (Numbers at top of Columns in Chart No. 1 are fabric code numbers.) This arrangement facilitates numerous comparisons and, when considered in conjunction with photographs of the fabrics, presents an important general conclusion which will be discussed in more detail later.

Comparison of Finished and Unfinished Fabrics

Columns 11 and 15—Spun viscose twill (5), has improved adhesion after anti-crease treatment (5a).

Columns 16 and 17—Cotton twill, oiled (4a), adheres more strongly in the unfinished (4) state.

Columns 13 and 14—Cotton poplin, water repellent treat-

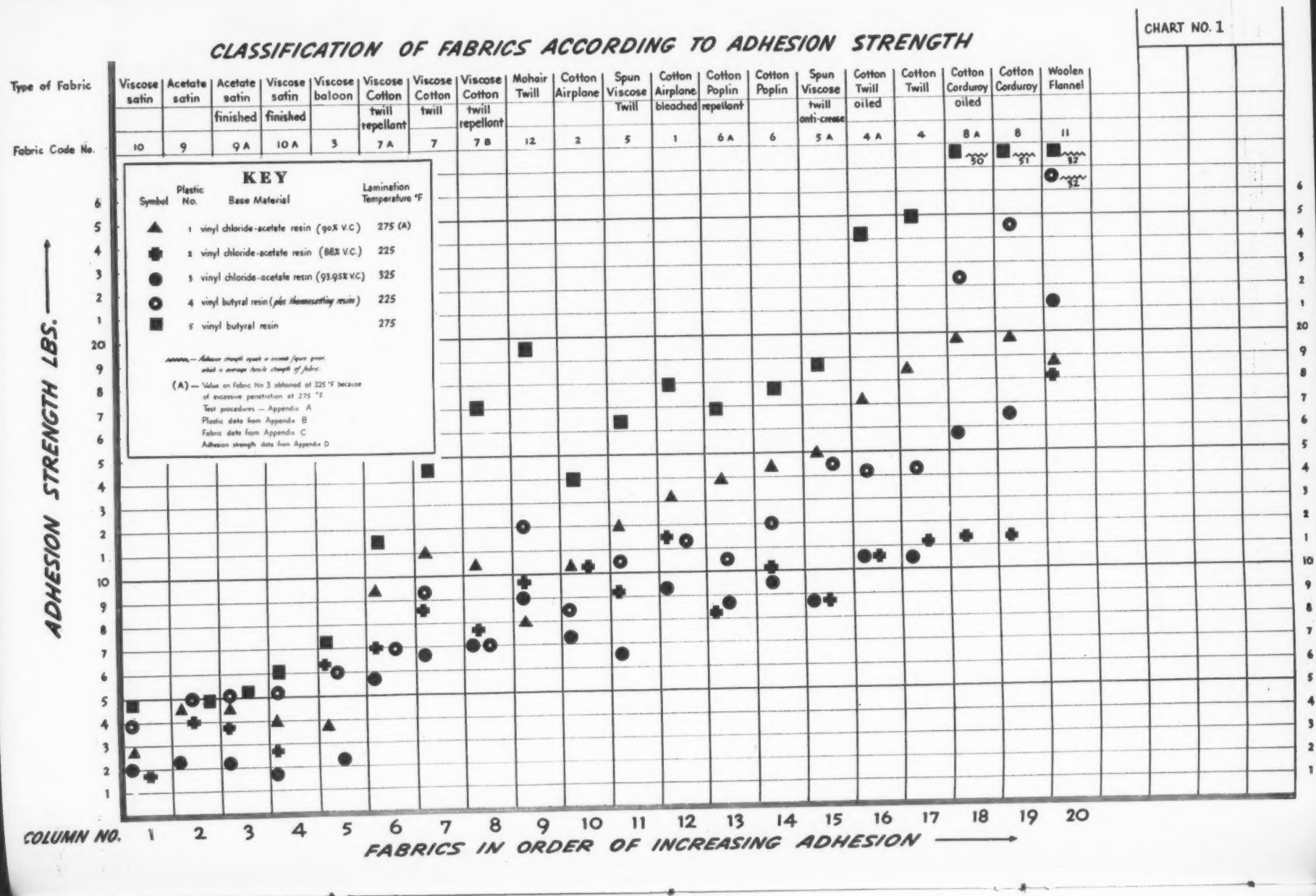


CHART NO. 1
CLASSIFICATION OF FABRICS ACCORDING TO ADHESION STRENGTH
Type of Fabric
Fabric Code No.
Viscose satin 10
Acetate satin 9
Acetate satin finished 9A
Viscose satin finished 10A
Viscose baloon 3
Viscose Cotton twill repellant 7A
Viscose Cotton twill 7
Viscose Cotton twill repellant 7B
Mohair Twill 12
Cotton Airplane 2
Spun Viscose Twill 5
Cotton Airplane bleached 1
Cotton Poplin repellant 6A
Cotton Poplin 6
Spun Viscose twill anti-crease 5A
Cotton Twill oiled 4A
Cotton Twill 4
Cotton Corduroy oiled 8A
Cotton Corduroy 8
Woolen Flannel 11
KEY
Symbol
Plastic No.
Base Material
Lamination Temperature °F
1 vinyl chloride-acetate resin (90% V.C.) 275 (A)
2 vinyl chloride-acetate resin (88% V.C.) 225
3 vinyl chloride-acetate resin (93.95% V.C.) 325
4 vinyl butyral resin (plus thermosetting resin) 225
5 vinyl butyral resin 275
Adhesion strength equals or exceeds fiber yield, which is average tensile strength of fabric.
(A) — Value on Fabric No 3 obtained at 225 °F because of excessive penetration at 275 °F.
Test procedures — Appendix A
Plastic data from Appendix B
Fabric data from Appendix C
Adhesion strength data from Appendix D
ADHESION STRENGTH LBS.
COLUMN NO. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
FABRICS IN ORDER OF INCREASING ADHESION

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ed (6a) exhibits improved adhesion in the unfinished (6) state.

Columns 10 and 12—Cotton airplane fabric (2) gives a stronger bond when bleached (1).

Further comparisons of effect of finish may be made on other fabrics such as Nos. (7), (8), and (9).

It is believed that these results justify giving the finish of the fabric careful consideration in choosing fabrics for textile-plastic combinations. In fact, it may indicate the possibility of developing special bonding finishes to facilitate production of textile-plastic combinations. Special bonding and priming finishes have long been used in the paint and varnish industry to improve adhesion of final coatings to metal, wood, and other surfaces.

Comparison of Yarns and Fibers

Columns 1 and 11—Viscose satin (10), compared with spun viscose twill (5) shows the latter has greater adhesion to the plastics tested.

Columns 5 and 12—Viscose balloon (3) and cotton airplane, bleached (1). The weaves are similar. The latter is considerably heavier and exhibits greater adhesion.

Appendix D, Table No. 6—Acetate satin (9), and finished acetate satin (9a) adhered so strongly to Plastic No. 6 that both fabrics broke before bond failure occurred. Plastic No. 6 being available only in the form of collar interliner fabric rather than in .008" plasticized continuous film form required for direct comparison with the other plastics, is not shown in Chart No. 1. Adhesion data obtained are given in detail in Appendix D.

The strong adhesion of cellulose acetate plastic to acetate rayon fabric, in striking contrast to adhesion obtained on other fabrics, immediately brings to mind the interesting possibility of improving bonds of this plastic to some other type of fabric by including a percentage of acetate rayon in the latter. The same conjecture applies to other plastics and fibers made from them.

The general effects of type of fiber and yarns will be shown subsequently.

Comparison of Various Plastics

In general, Chart No. 1 shows the plastics tested maintain reasonably closely their same relative adhesion strength relationship on all fabrics.

The noticeably high adhesion of Plastic No. 5 is to be expected because the material is known to show greater adhesive properties to other surfaces such as glass, cellophane, etc., than do the other plastics. The material was originally developed for use in laminating safety glass. This plastic roughly illustrates the degree of influence basic plastic modifications can exert on adhesion strength. Practically, the degree is lessened considerably because other factors such as water-resistance, economy of production, flexibility, etc., limit the manufacturer of plastics. Plastic No. 4 illustrates the lowering of adhesion values when Plastic No. 5 is modified by compounding with curing resins to obtain greater water resistance, higher softening range, etc.

Comparison of Visibly Discernible Surface Characteristics of Fabrics

One of the most illuminating and striking results of this study is obtained by a comparison of the classification of fabrics on Chart No. 1 with photographs of the fabrics under magnification. Arranging the photographs of the fabrics in order of increasing surface roughness results in a classification of fabrics practically identical with that given in Chart No. 1. Figures 2, 3, and 4, which are photos of the viscose balloon (3), spun viscose twill (5), and woolen flannel (11), cover the range of surface roughness of the fabrics tested. These fabrics are shown in Columns No. 5, 11, and 20.

From these comparisons it is concluded that adhesion of this group of plastics to fabrics, under conditions of combining as described, is influenced largely by mechanical anchorage or dove-tailing of the plastic in the surface irregularities of the fabrics. In general, those plastics which had higher softening ranges, as might be expected, necessitated higher combining temperatures to develop maximum adhesion. The suitably high temperature causes the plastic to soften sufficiently to flow into and around the minute surface irregularities and extended fibers of the base fabric. In some cases where still higher lamination temperatures were employed, the plastic softened excessively and, under the pressure employed, was dissipated in the fabric, leaving insufficient material between the fabric surfaces to form a strong bond.

Exploratory Steps

Because of the interest previously described results of this study aroused, several exploratory tests were made to investigate the applicability of the results to lamination of dissimilar fabrics. Dissimilar fabric laminations such as woolen flannel or corduroy to windbreaker poplin, rayon to cotton, etc., appeared of interest in miscellaneous garment manufacture. The data on this exploratory work is given in Appendix E. As might be expected, the bond strengths obtained when unlike fabrics are combined approximates the lower figure obtained when each of the fabrics involved is laminated to itself and tested for adhesion. In other words, a chain is no stronger than its weakest link.

Some exploratory work was also performed on the use of water emulsions of organic solvent solutions of the test plastics. Although there were general indications that (1) previously described adhesion data applies to the operation, (2) slightly increased air porosity is obtained as compared to continuous plastic sheeting laminations and (3) that greater porosity resulted when air flow measured with the smoother fabric on the high pressure side of the test specimen—it should be emphasized that results are exploratory in character.

Conclusions

To summarize the general results of this investigation, it is concluded that—

(1) A reliable and rapid test method for evaluating adhesion of textile-plastic combinations has been developed.

COLUMN NO. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 FABRICS IN ORDER OF INCREASING ADHESION

PHOTOGRAPHS OF TEST FABRICS

X8 Magnification; by Reflected Light

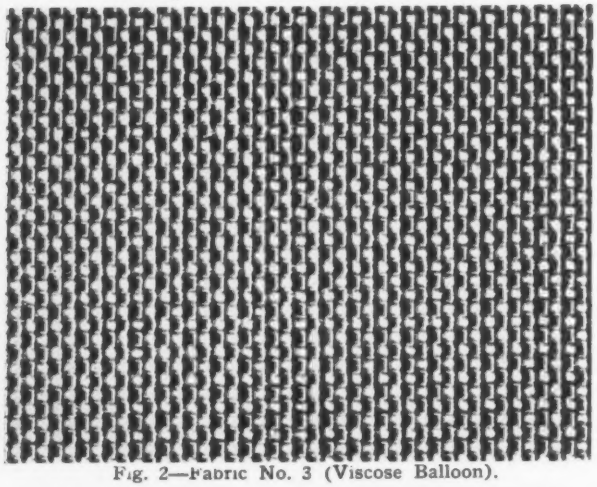


Fig. 2—Fabric No. 3 (Viscose Balloon).

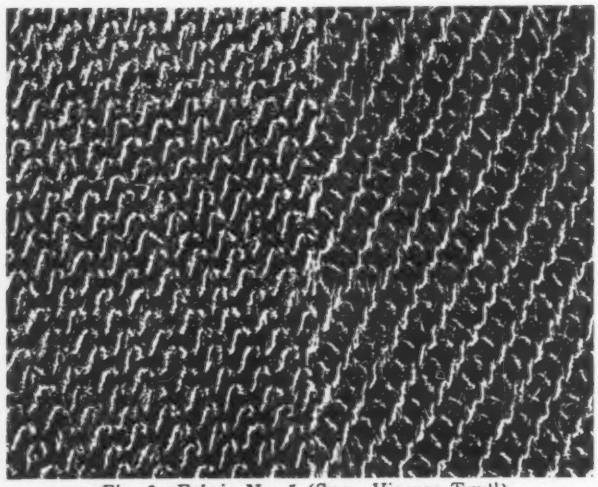


Fig. 3—Fabric No. 5 (Spun Viscose Twill).

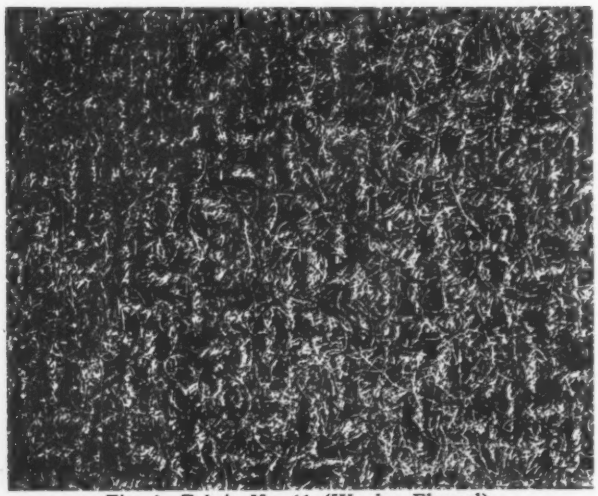


Fig. 4—Fabric No. 11 (Woolen Flannel).

(2) Definite relationships of textile fiber and fabric construction with degree of adhesion obtained on textile-plastic combinations have been established as guides for industries involved in production of these materials.

(3) The interrelationship of other factors influencing adhesion, such as type of plastic, combining conditions, finishes, etc., has been indicated as a guide to the application of test data in manufacturing operations.

(4) A number of interesting "leads" for future investigation by the industry, concerning items such as special bonding textile finishes, mixed fiber fabrics, dissimilar laminations, emulsion combining, etc., have been uncovered.

In closing, it is obvious that the factors involved in the production of textile-plastic combinations are numerous, and their complex interrelationships require the full co-operation of the textile manufacturer, finisher, plastic processor and manufacturer to obtain the utmost consumption of textiles in the form of textile-plastic combinations.

* * *

ACKNOWLEDGMENT

The Intersectional Contest Paper Committee of the New York Section of the American Association of Textile Chemists and Colorists hereby expresses its gratitude to concerns whose considerate co-operation in contributing personnel services, equipment services, materials, and/or miscellaneous facilities made it possible to conduct this study. The contributing companies are as follows:

American Cyanamid Co.
American Enka Corp.
American Viscose Corp.
Aridye Corp.
Bakelite Corp.
Better Fabrics Testing Bureau
Botany Worsted Mills
Carbide & Carbon Chemicals Corp., Plastics Division
Celanese Corp.
E. I. duPont de Nemours & Co., Fabrikoid and Plastics Divisions
Eastman Kodak Co.
Fairforest Finishing Co.
Julius Forstman Corp.
Manhattan Shirt Co.
Merrimac Manufacturing Co., Inc.
Newmarket Manufacturing Co.
Onyx Oil and Chemical Co.
Sayles Finishing Plants, Inc.
J. P. Stevens Co.
A. M. Tenney Associates
U. S. Naval Clothing Depot, Brooklyn, N. Y.
Wallerstein Textiles
Wellington-Sears Co., Inc.

APPENDIX A

Lamination and Adhesion Test Details

Lamination

Equipment—Starchless collar press, Type 64M, Manufactured by American Laundry Machine Co.

Materials—Double face canton flannel, broadcloth, 3 x 14-inch strip of test fabric, cut so that 14" dimension is parallel with the warp, and 2 x 6 x .008 inch strip of test plastic.

Procedure—Fold test fabric (back to back) to 3 x 7 inch size, place strip of test plastic between folds of the fabric so that ½ inch margin remains along the 7-inch edge of folded fabric, and a one inch margin remains at the free ends of the folded fabric strip.

Place in press which has top and bottom platens covered with one thickness of flannel and two thicknesses of broadcloth. (Flannel needed to give uniform pressure,—placed on both platens to assure uniform heating of both sides of sample), apply 75 lbs. per sq. in. pressure for 30 seconds. Open press and remove sample.

Adhesion Test

Equipment—Scott vertical testing, 100 lb. capacity, Model J-2. Three-inch back and front jaws, ½ inch between jaws. Speed of movable jaw—12 inches per minute.

Materials—Test sample as described above.

Procedure—Condition sample for four hours at 72° F. and 65% relative humidity.

Place each of free ends in one of jaws and apply tension. Read pounds pull from indicator as the sample is delaminated, or from recording chart after complete delamination. Repeat on 9 identical samples and report average of all 10 pulls as average adhesion value.

APPENDIX B

Identification and General Characteristics of Test Plastic Compounds

Plastic No.	*Base*	*Plasticizer and Percentage*	*Type Compound*	*Manufacturers Identification*
1.	Vinyl chloride-acetate resin (90% V.C.) (Av. Mol. Wt:-16,000)	Ethyl hexyl phthalate, 35%	Thermoplastic	F-6375, Clear
2.	Vinyl chloride-acetate resin (88% V.C.) (Av. Mol. Wt:-10,000)	Butoxy-ethyl phthalate, 22%	Thermoplastic	F-6376, Clear
3.	Vinyl chloride-acetate resin (93-95% V.C.) (Av. Mol. Wt:-24,000)	Ethyl hexyl phthalate, 45%	Thermoplastic	VU-5955, O.D.
4.	Vinyl butyral resin (6-7% hydroxyl) plus curing resins	Triethylene glycol octoate and castor oil	Thermosetting	XU-5617, O.D.
5.	Vinyl butyral resin (6-7% hydroxyl)	Triethylene glycol hexoate 30%	Thermoplastic	XU-1315, Natural
6.	Cellulose acetate	Plasticized	Thermoplastic	47-892 Interliner

NOTE:—No. 6 compound was in form of fused collar interliner fabric.
All other compounds in form of .008 inch thick flexible sheeting.

APPENDIX C

Identification and Characteristics of Fabrics Tested

Fabric Code	*Type of Fabric*	*Weave*	*Construction*		*Yarns*		*Wt./sq./yd.*	*Tensile Strength*	
			Warp	*Filling*	*Warp*	*Filling*		*Warp*	*Filling*
1	Cotton Mercerized and Bleached Ballon Fab.	Plain	87	83	30/2 Cotton	30/2 Cotton	4.0 oz.	65.0	78.0
2	Cotton Mercerized Ballon Fabric	Plain	85	84	30/2 Cotton	30/2 Cotton	4.0	87.0	91.0
3	Viscose rayon experimental ballon fabric	Plain	106	94	75/30 rayon	75/30 rayon	2.0	52.0	59.0
4	Cotton army twill type 1	3/1 twill	115	56	36/2 cotton	24/2 cotton	7.5	176.0	119.0
4A	Cotton army twill type 1	3/1 twill	116	55	20/2 cotton	12/2 cotton	8.5	166.0	135.8
5	Spun viscose rayon twill	2/2 twill	130	73	22/1 spun rayon	22/1 spun rayon	5.6	118.0	63.0
5A	Spun viscose rayon twill	2/2 twill	135	67	28/1 spun rayon	20/1 spun rayon	5.6	114.0	67.0
6	Cotton wind resistant poplin	Plain	109	52	34/2 cotton	20/1 cotton	6.0	155.0	73.0
6A	Cotton wind resistant poplin	Plain	104	55	20/1 cotton	16/2 cotton	6.6	140.0	78.0
7	Rayon warp cotton filled twill	3/1 twill	244	68	150/40 visc. rayon	51/3 cotton	7.8	170.0	112.0
7A	Rayon warp cotton filled twill	3/1 twill	246	64	150/40 visc. rayon	30/2 cotton	8.0	196.0	97.0
7B	Rayon warp cotton filled twill	3/1 twill	240	68	150/40 visc. rayon	51/3 cotton	7.9	193.0	98.0
8	Cotton Corduroy	Corduroy	82	144	15/1 cotton	20/1 cotton	7.5	56.0	49.0
8A	Cotton Corduroy	Corduroy	84	144	15/1 cotton	20/1 cotton	7.7	50.0	49
9	Acetate rayon satin	5 shaft satin	235	72	100/25 brt. acetate	100/25 brt. acetate	3.6	78.0	25

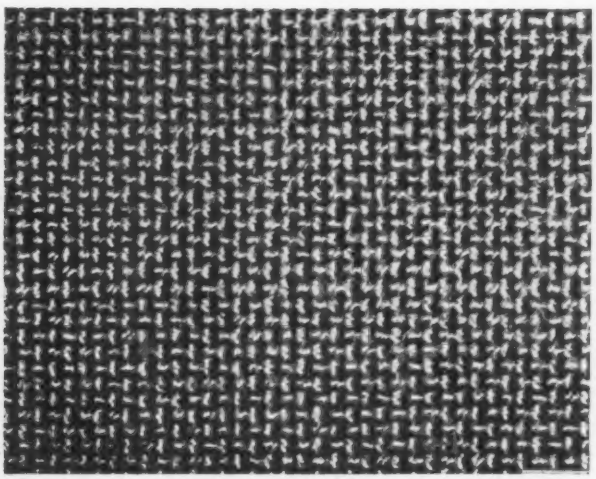
APPENDIX C, (Continued)

Fabric Code	Type of Fabric	Weave	Construction Warp	Construction Filling	Yarns Warp	Yarns Filling	Tensile Strength wt./sq./yd.	Tensile Strength Warp	Tensile Strength Filling
9A	Acetate rayon satin	5 shaft satin	235	71	100/25 brt. acetate	100/25 brt. acetate	3.8	87.0	26.0
10	Viscose rayon satin	5 shaft satin	215	63	100/40 brt. rayon	100/40 brt. rayon	3.6	128.0	38.0
10A	Viscose rayon satin	5 shaft satin	230	68	100/40 brt. rayon	100/40 brt. rayon	3.8	139.0	38.0
11	All wool flannel	2/2 twill	55	39	24/1 worsted	26/1 wool	7.9	32.0	17.0
12	All wool mohair gabardine	2/2 twill	115	76	25/1 worsted	35/1 worsted	12.2	88.5	38.1

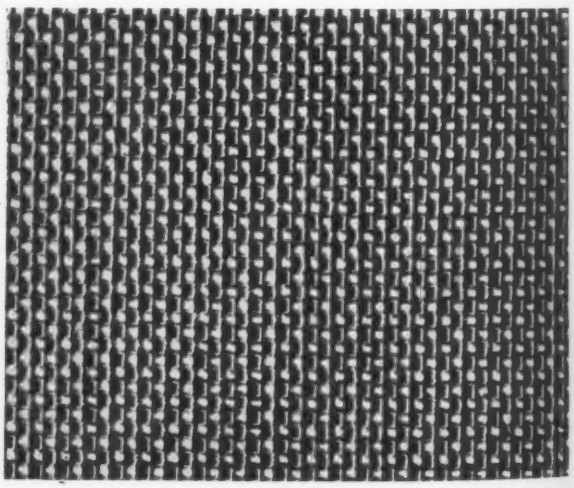
	Permeability (Permeometer)	Finish	Sizing
1	107	Finished	None
2	110	Finished	
3	248	Finished	
4	54.6	No finishing oils	
4A	54.0	Finished	0.35%
5	136.6	No finishing treatment	
5A	130.7	Urea Formaldehyde treated	
6	34.8	No finishing oils	
6A	26.3	Durable repellent*	1.53%
7	73.0	No finishing treatment	
7A	62.7	Durable repellent*	1.25%
7B	109.3	Durable repellent†	2.33%
8		No finishing oils	
8A	57.5	Finished	1.63%
9		No finishing oils	
9A	73.2	Finished	
10	71.2	No finishing oils	
10A	76.0	Finished	
11	407		
12	104		

* Stearyl urea base.
† Wax base.

TEST FABRICS

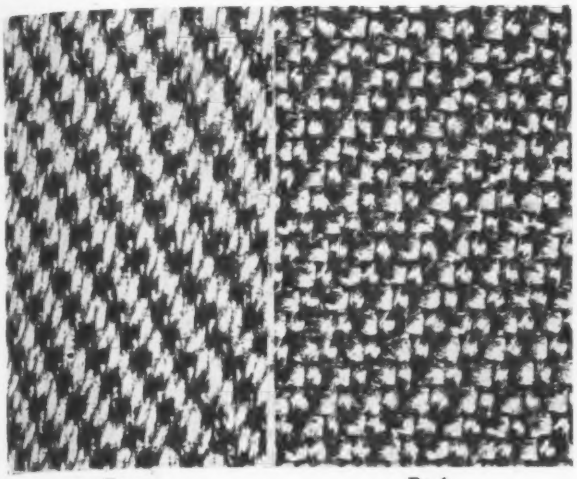


Fabric No. 1
Cotton Airplane, Bleached.



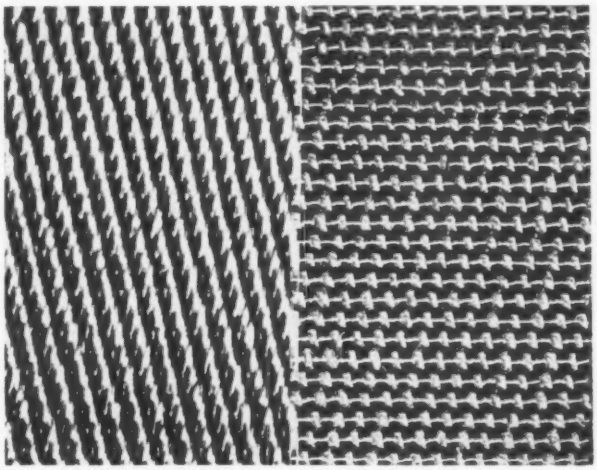
Fabric No. 3
Viscose Rayon Balloon.

APPENDIX C, (Cont.)



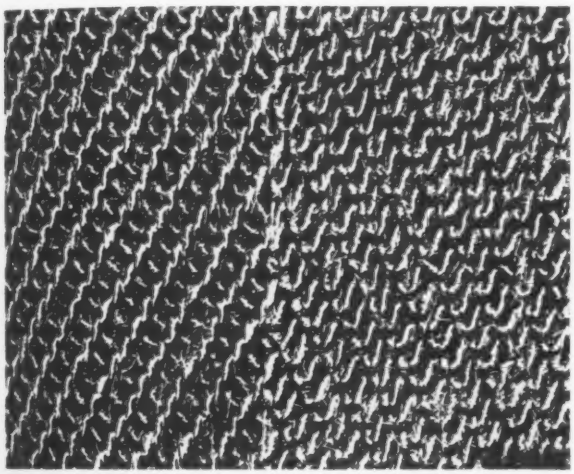
Face Back

Fabric No. 4—Cotton Twill.



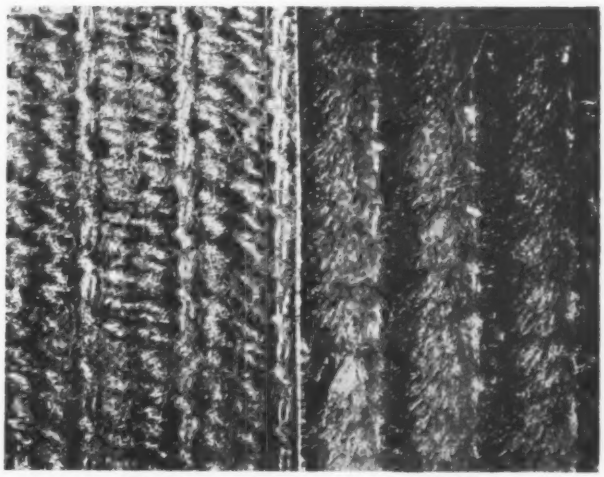
Face Back

Fabric No. 7—Viscose Rayon-Cotton Twill.



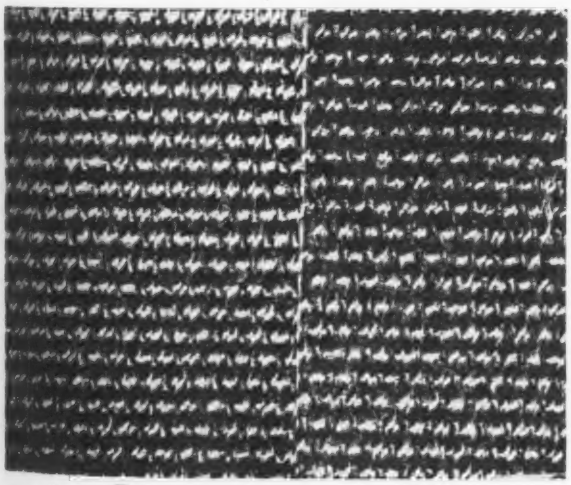
Face Back

Fabric No. 5—Spun Viscose Rayon Twill.



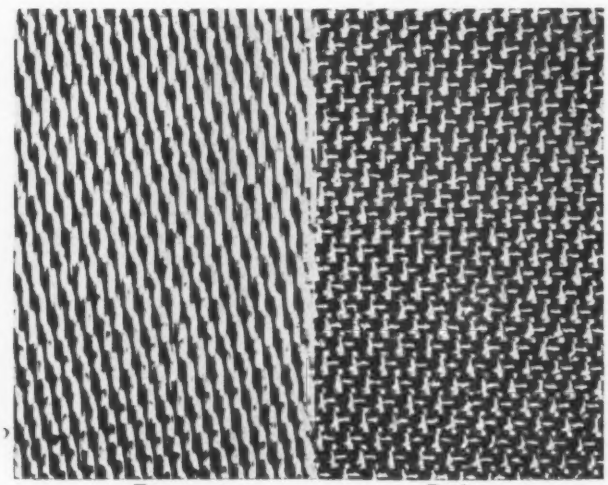
Face Back

Fabric No. 8—Cotton Corduroy.



Face Back

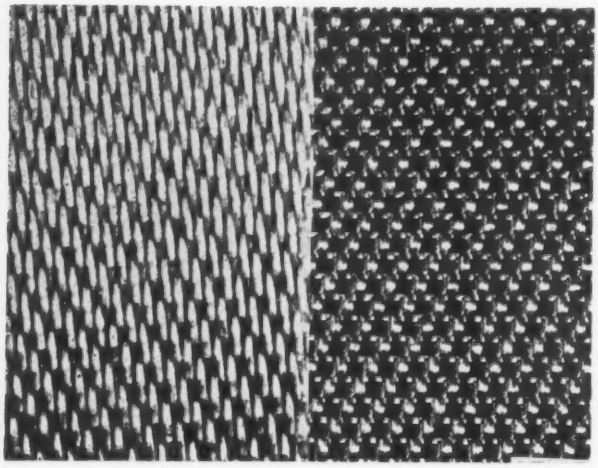
Fabric No. 6—Cotton Poplin.



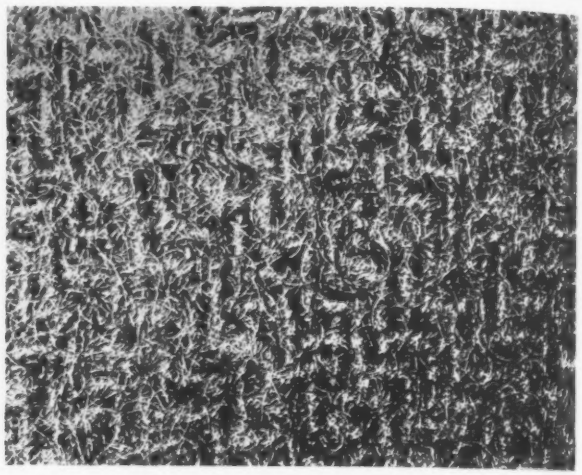
Face Back

Fabric No. 9—Acetate Rayon Satin.

APPENDIX C, (Cont.)



Face Back
Fabric No. 10—Viscose Rayon Satin.



Fabric No. 11—Woolen Flannel.

Note: Could not properly photograph fabric No. 12 because it was jet black.

APPENDIX D

Average Results of Adhesion Strength Tests on Plastic No. 1 (Plasticized Vinyl Chloride—Acetate Resin) (Expressed in Pounds Full)

Fabric Code Number	*Laminating Temp. 225° F.*	*Laminating Temp. 275° F.*	*Laminating Temp. 325° F.*
1	11.6	13.4	Excessive Penetration
2	10.0	10.5	Excessive Penetration
3	4.0	Excessive Penetration	Excessive Penetration
4	6.0	18.8	5.7
4A	6.2	17.5	4.6
5	4.7	12.2	3.0
5A	5.6	15.3	2.5
6	4.3	14.5	6.6
6A	3.7	14.2	3.8
7	3.7	11.3	7.2
7A	2.4	9.7	6.8
7B	1.8	10.7	7.1
8	7.8	20.0	4.9
8A	8.5	19.9	3.6
9	1.8	4.8	4.8
9A	1.8	4.7	4.9
10	0.8	3.1	4.4
10A	0.7	4.2	4.6
11	18.4	18.9	5.2
12	4.7	8.3	Excessive Penetration

Average Results of Adhesion Strength Tests on Plastic No. 2 (Plasticized Vinyl Chloride—Acetate Resin) (Expressed in Pounds Pull)

Fabric Code Number	*Laminating Temp. 225° F. Lbs.*	*Laminating Temp. 275° F.*	*Laminating Temp. 325° F.*
1	11.8	Preliminary	Preliminary
2	10.4	samples	samples
3	6.6	showed	showed
4	11.4	excessive	excessive
4A	10.9	penetration	penetration
5	9.5		
5A	9.1		
6	10.3		
6A	8.4		
7	8.8		
7A	7.2		
7B	7.9		
8	11.6		
8A	11.6		
9	4.3		
9A	3.9		
10	2.0		
10A	2.8		
11	18.3		
12	9.9		

Average Results of Adhesion Strength Tests on Plastic No. 3 (Plasticized Vinyl Chloride—Acetate Resin) (Expressed in Pounds Pull)

Fabric Code Number	*Laminating Temp. 225° F.*	*Laminating Temp. 275° F. Lbs.*	*Laminating Temp. 325° F. Lbs.*
1	0	4.12	9.55
2	0	3.125	7.32
3	0	1.47	2.42
4	0	3.49	11.0
4A	0	2.47	11.0
5	0	2.23	6.83
5A	0	4.57	9.1
6	0	3.1	9.8
6A	0	2.9	8.83
7	0	1.15	6.9
7A	0	.85	5.47
7B	0	1.125	7.2
8	0	6.07	16.8
8A	0	7.15	16.0
9	0	.575	2.5
9A	0	.525	2.42
10	0	.55	2.1
10A	0	.275	1.975
11	0	16.7	21.47
12	0	1.93	9.3

APPENDIX D, (Cont.)

Average Results of Adhesion Strength Tests on Plastic No. 4 (Plasticized Vinyl Butyral Thermosetting Resin) (Expressed in Pounds Pull)

Fabric Code Number	Laminating Temp. 225° F.	Laminating Temp. 275° F.	Laminating Temp. 325° F.
1	11.6		
2	8.8		
3	6.2		
4	14.7	Several Preliminary Samples	
4A	14.6	Showed Excessive Penetration	
5	10.7		
5A	14.8		
6	12.2		
6A	10.7		
7	9.4		
7A	7.1		
7B	7.2		
8	24.6		
8A	22.6		
9	5.1		
9A	5.4		
10	4.1		
10A	5.4		
11	33.3		
12	12.2		

Samples cured for 1 hour at 260° F. after laminating.

Average Results of Adhesion Strength Tests on Plastic No. 5 (Plasticized Vinyl Butyral) (Expressed in Pounds Pull)

Fabric Code Number	Laminating Temp. 225° F. Lbs.	Laminating Temp. 275° F. Lbs.	Laminating Temp. 325° F.
1	11.6	18.12	
2	8.67	14.17	
3	4.57	7.42	Several
4	12.8	25.4	preliminary
4A	15.6	24.5	samples
5	9.67	16.72	showed
5A	9.17	19.0	excessive
6	11.6	18.0	penetration
6A	9.07	17.22	
7	11.45	14.9	
7A	6.15	11.87	
7B	11.72	17.1	
8	16.8	50.75	
8A	16.2	Adhesion Greater than Fabric Strength	
9	2.47	5.17	
9A	2.3	5.45	
10	2.92	4.95	
10A	3.47	6.43	
11	29.9	Adhesion Greater than Fabric Strength	
12	8.7	19.7	

Average Results of Adhesion Strength Tests on Plastic No. 6 (Plasticized Cellulose Acetate Fabric) (Expressed in Pounds Pull)

Fabric Code Number	Laminating Temp. 225° F.	Laminating Temp. 275° F.	Laminating Temp. 325° F.
1	4.6	5.6	6.7
2	3.6	4.9	5.2
3	1.2	2.2	2.6
4	6.4	6.9	8.3
4A	5.8	7.9	8.3
5	3.7	3.6	5.0
5A	3.2	4.4	5.0
6	4.6	4.6	6.9
6A	2.6	2.9	4.3
7	4.5	4.8	5.8
7A	2.1	3.5	3.8
7B	1.9	3.7	3.8
8	6.4	9.3	9.9
8A	6.8	8.7	10.4
9	2.5	7.1	Adhesion Greater than Fabric Strength
9A	2.6	No Sample	Adhesion Greater than Fabric Strength
10	1.1	.9	1.6
10A	1.2	1.3	2.2
11	7.4	8.1	8.0
12	2.0	2.9	3.5

Note: Fabrics moistened with water before lamination.

APPENDIX E

Comparison of the Average Adhesion Strengths (lbs. pull) of Laminations of Like Fabrics and Dissimilar Fabrics—Using Plastic No. 3 and Lamination Temperature of 325° F.

Fabric Code Nos.	1	4	4a	6	6a	7	7a	7b	8	8a	11
1	9.5								8.4	10.0	14.0
4		11.0							11.0	12.0	12.0
4a			11.0						11.0	12.0	15.0
6				9.8					8.5	11.0	8.5
6a					8.7				7.5	8.5	8.0
7						6.8			5.5	7.5	5.5
7a							5.5		4.0	6.0	4.5
7b								7.2	..	6.5	8.0
8									16.8		
8a										16.0	
11											21.5

Diagonal line of figures, from upper left to lower right, are values for lamination of like fabrics, e.g.; 1 to 1, 4 to 4, 4a to 4a, etc.

Right hand vertical columns of figures are values on dissimilar fabric laminations, e.g.; 1 to 8, 4 to 8, 4a to 8, etc.

MEETING, PHILADELPHIA SECTION

A MEETING of the Philadelphia Section was held on Friday evening, October 29, 1943, at the Hotel Philadelphian at 7 o'clock. One hundred and twenty persons were present.

The topic of the evening was entitled, "Minimum Chrome Required for Afterchrome Dyeing," and was presented by Henry E. Millson of Calco Chemical Company. The talk was accompanied by slide demonstrations, corroborating the curves, as a result of the research work done by the committee in the preparation of this paper.

The above subject was the one which had been presented the week before at the meeting in New York, and represented Philadelphia's contribution in the Intersectional Contest. As a matter of interest, this paper was awarded first prize in the contest.

Respectfully submitted,

BOYCE C. BOND, *Secretary*

Intersectional Contest—

The Processing of Acetate FULL-FASHIONED HOSIERY

Presented for the South Central Section

by J. A. CRUMLEY
Hosiery Processing Co.

COMMITTEE

J. A. Crumley, Chairman, Hosiery Processing Co.
W. K. Newman, Peerless Woolen Mills.
Homer Whelchel, Central Franklin Process Co.

ACETATE rayon is new to most manufacturers of full-fashioned hosiery. The technique of handling it is in nearly every way similar to nylon. In fact, several of the developments in nylon procedure have been adopted to an advantage in the processing of acetate.

This newcomer cannot be handled haphazardly. It is demanding in its needs and an exactness in each operation is rewarded by a beautiful job of finishing. Every link in the processing chain must tie in with the whole process else a weakness exists either hidden or visible that can cause trouble.

Let us briefly review the characteristics of acetate rayon, then we will know far better how to apply ourselves to get best results. Acetate rayon is inherently weaker than viscose yarn. This weakness in tensile strength is catered to as we process. It is allergic to heat. High temperatures plasticize it and impair the tensile strength. It is delustered in almost exact ratio to the increase of heat in the higher temperature bracket, and its affinity for dyestuff is decreased in the same proportion as the temperature rises. We cannot afford to add any weakness by careless handling or improper methods.

Our next "bugaboo" is WRINKLES. They can be added during every step. Our planned procedure is to prevent them.

Next—we are dealing with a material that has queer dyeing properties, for which we use still stranger acting dyestuffs.

With this knowledge of the peculiarities of our material, we are ready to proceed; a general idea of what will happen is ours. Our sole purpose from now on is to find that happy medium of maximum strength, best hand and appearance with proper color.

To secure the best appearance and finish on acetate, it is necessary to pre-board it.

The pre-boarding procedure consists of shaping the hosiery in the greige to the exact shape it will have when finished. This is accomplished by means of steam and pressure. It is an operation previous to dyeing and boarding, so the name "pre-boarding" is appropriate.

Metal boards are used exactly like the shape and size of those in the final boarding. Upon these the greige stockings are placed, being carefully smoothed out as if it were the finish boarding. These are then placed in a cylinder or compartment which can be closed and made pressure tight.

Steam is introduced which creates, through temperature and pressure, changes in the structure of the acetate, causing it to shrink and assume a pre-set condition. The shrinking causes an improved fabric, eliminating wrinkles, looseness and sleazy stitches, conditions the knitter cannot always control. A dulling effect or de-lustering, as we call it, also occurs.

A number of after effects are dependent upon this operation and it is one of the most important in the chain. The time element also is important, since the amount of time in which they are in the compartment under pressure is relative to results obtained.

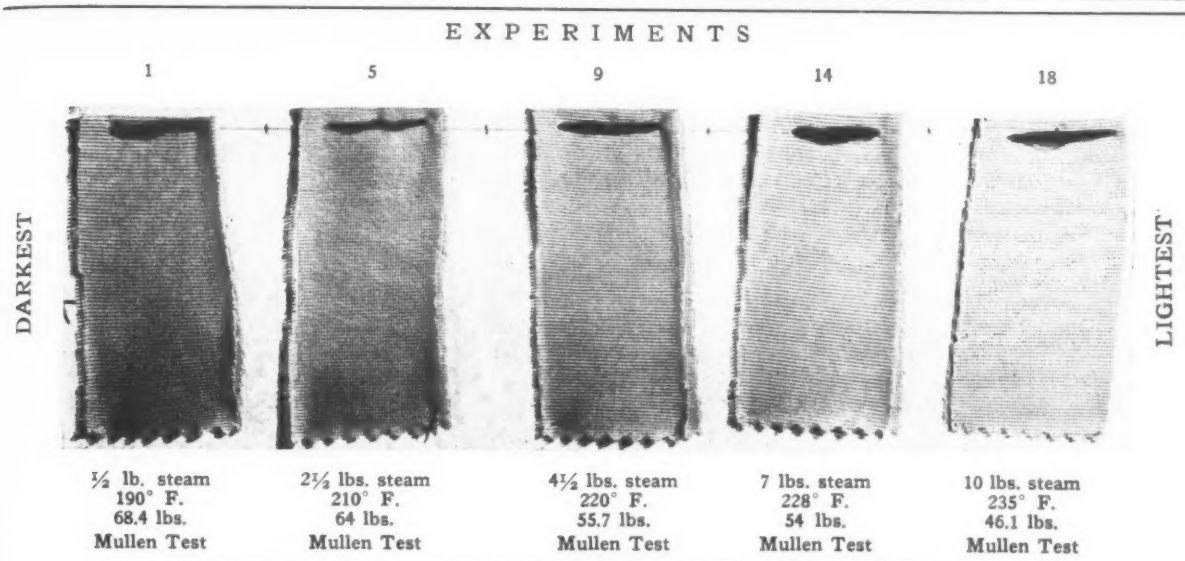
As we proceed further you will see how important preboarding is to the final product.

Before I made the tests, given later in this article, every degree of temperature ranging from 190 to 215° F., had been suggested as being right to pre-board. No two finishers seemed to be in accord. It is an axiom that conditions in all mills are different by virtue of varying factors concerned.

Rather than proceed by trial and error, I decided to exhaust the range of possibilities from lowest to highest of the suggested temperatures for pre-boarding by graduated steps. Somewhere along the line, I would find our ideal at the point where the best results in each feature desired crossed.

Since knitting is an art in itself, we will assume that the stockings delivered to us for processing have been knit under ideal conditions. Forty-two gauge ladies full fashioned hose of 100 denier acetate yarn, were used for the experiment.

Starting with a pre-boarding machine set at half a pound steam pressure, four stockings were steamed exactly three minutes. They were removed and pinned together with a Monel numbered pin which would later identify them through the dyeing and boarding operations by number. Next—four more hose were entered and the pressure was



SWATCHES TO ILLUSTRATE COLOR GRADATION DELUSTERING

raised to one pound. The same time allowance for the steaming was followed all the way through.

A set of consecutive numbered pins were used in the order from one to 18 as the test proceeded, each test being pinned together. By half pound increases, the pressure was raised finally to ten pounds, giving 18 experiments ranging from 190° F. to 235°. Four stockings were used in each run.

The temperature result for each half step increase of steam pressure is given below together with the average result of the Mullen test. The Mullen tests were conducted after dyeing and boarding, but are given at this time for briefness and so a complete picture is seen in a comparative way of what happened. Everything except color and physical appearance is covered. Result as follows:

Pin	*Lb. Steam*	*Degrees Fahrenheit*	*Mullen Test Lbs.*
1	½	190	68.4
2	1	195	68.2
3	1½	200	66.4
4	2	205	64.5
5	2½	210	64
6	3	212	62.5
7	3½	214	59.7
8	4	216	60.1
9	4½	220	55.7
10	5	222	57
11	5½	223	60.4
12	6	224	55.2
13	6½	225	55
14	7	228	54
15	7½	230	52.7
16	8	230	51.1
17	8½	230	48.2
18	10	235	46.1

There is a loss of 22 pounds in breaking strength between the lowest temperature and the highest. Seven break tests were made on each stocking running from flare narrowing

One stocking from one of the eighteen experiments. This illustrates how the breaks were made for the Mullen Test. Result arrived at by average of the seven breaks per stocking.

courses in center of wales in leg—downward in regular intervals to and including the ankle. The loss of strength by rise in temperature in the pre-boarding was so exactly proportional it was amazing. The break tests were made

after the boarding as the groups of four came to hand and in no certain order. Consequently, they were not arranged: yet—I could have picked each out and almost put them in the exact consecutive order in which the test was made—so progressively did the loss in breaking strength occur.

With these facts before us, it certainly behooves one to get as low a temperature as possible in pre-boarding to have most strength. The lowest temperature is not ideal for the shaping and fabric clearing of the hose, so we compromise at the point where a good set is obtained.

To us—*Experiment* 5 is the best. By the liveness of its feel, the freedom from wrinkles and general color appearance, it is the most nearly ideal for our own particular set of conditions. However, until this run of tests were made, our pre-boarding followed the pressure set up of Experiment 9. A much greater strength will hereafter be realized, by the change to lower temperature and pressure.

The next surprising thing was the change in color range from Experiment 1, the lowest temperature to experiment 18 with the highest temperature. The groups were arranged out on a table in consecutive order from left to right as processed. There was a perfect graduation of color step by step, from the darkest stocking of lowest heat to the lightest stocking of experiment 18. Here again an experienced pairer used to shading hosiery, could have placed them almost in exact order, by shade, without the use of the number pins. Between the lowest and highest temperatures, there was an estimated color difference of 50 per cent or more.

Again our eyes take us back to Experiment 5 as the best color of the lot. I will explain why.

Experiment 1 at the beginning had the most light reflection or shininess. This was gradually dulled as the pressure and temperature rose until the last stockings of Experiment 18 were completely de-lustered. They were dull and lifeless, also somewhat stiff to handle.

At the midway point, Experiment 9 began to show splotches or lakes of delustered areas interspersed with shiny spots. It was just beginning to turn over. This condition is termed "saponification."

From nine over to 18 the delustering proceeded at an accelerated rate.

Experiment 5 was the happy medium between too bright and too dull luster with a good color appearance. The best all-around condition seems to exist at this point.

From pre-boarding on, our fight will be against WRINKLES. Where time permits, the stockings coming out of the pre-boarder should stand a few minutes while the latent heat of the boards dry off excess moisture. Should they be packed away damp sometime before dyeing—two conditions set up. The pre-boarding set to shape is broken down into wrinkles and mildew can start. To further preserve the shape set by a temperature of 210 degrees, we must not approach this temperature too closely in dyeing or else we will destroy the set to shape. Wrinkles will show up. A differential of 40 degrees less for dyeing than pre-boarding seems about right. So we set up 170 degrees as the maximum temperature for the dye bath.

The longer a dye bath is run, the more tangled the goods and the more wrinkles we find. That feature causes us to favor one bath method. Only in cases of heavily tinted goods should the two-bath method be used. Then it is necessary.

Our dyeing procedure is as follows:

To our dye machine we added 10 per cent soap and 5 per cent penetrant. When thoroughly mixed the goods were entered and the temperature was gradually brought up to luke warm. After running five minutes to get an even distribution of soap and penetrant, the dyestuff was added. Regular acetate dyestuffs as used on nylon were employed. These were pasted up with a sulfonated oil which acts as a dispersing agent. After five minutes with the dyestuff in the bath, one-half of one per cent of Glauber's salt was added. The bath is brought up to 170 degrees and run 20 minutes then 3 per cent salt is added and it is further run 20 minutes. At this time it is sampled and additions for color corrections are made. For each addition on the cotton, 10 minute intervals are allowed between addition and sampling. For each addition of acetate dyestuff, 20 minutes are allowed.

When the desired shade is reached, we are ready to rinse. Cold water must never be turned in on hot acetate goods, so we gradually flush the machine over the top until we come down to 110 degrees. Then it is drained and again rinsed.

Next we fill up for the finish bath.

Finish as used on the viscose type of rayon will be applied.

First the duller is introduced into the finish bath. A point of caution here is in order. Partial delustering occurred in the pre-boarding operation, so the full amount of duller is not needed. Experiment here until your judgment is satisfied about luster. Just do not over-do it. Some of the dull, dead, soap-stone effects are displeasing to the eye.

The filler or body imparting agent too should be tested out to reach the desired hand you desire. Each degree of higher temperature increases the set and each bit of shrinkage as a result, gives body stiffness.

Splash-proof and finally a cation-softener are added in order.

I have given no definite amounts or percentages of finish to use, because no two mills have the same idea about what they want. The management, as influenced by the sales department, usually has specific ideas in mind of how dull and how flexible to handle the finished hose must be. The temperature you decide to pre-board at in your own individual case, is relative also in determining how much of each ingredient to use.

(Concluded on page P538)

Intersectional Contest—

The Effect of RAW STOCK DYEING on the Fiber and Manufacturing Properties of Cotton

Presented for the Southeastern Section

by W. B. GRIFFIN

Kali Manufacturing Co.

COMMITTEE

John E. Smenner, Chairman, Eagle & Phenix Mills.
L. E. Whittlesey, Vice-Chairman, Southern Dyestuff Corp.
O. G. Edwards, Avondale Mills.
Robert Simons, Pepperell Mfg. Co.
Robert McCamy, Pepperell Mfg. Co.
M. T. Barnhill, Avondale Mills.

THE purpose of this paper is to present the results of a study of the effects of various dyestuffs and dyeing procedures on the subsequent manufacturing qualities of stock dyed cotton. This work is a continuation of the work done by the Southeastern Section last year* and is more comprehensive in its scope.

The cotton fiber and the manufacture of cotton into yarn and cloth have been the subject of much research. Considerable data have been accumulated on natural cotton, and we can predict quite accurately how a given cotton will behave in the manufacturing processes. This is due to the fact that all previous research has been conducted on natural cotton, and nowhere have we found any report on similar research on stock dyed cotton. In view of the long recognized and accepted idea that dyeing and related processes adversely affect the manufacturing qualities of cotton, we are now endeavoring to ascertain what, if any, actual changes in the fiber length, fiber strength and fiber fineness, are caused by the dyeing operation, and to what extent these changes, if any, affect the manufacturing performance.

Our tests have been made on sulfur navy, sulfur black, vat pastel blue, and naphthol red, using similar natural cotton as a control. The factors to be considered for comparison will appear in the discussion of results.

In order to gain a better perspective, tests were made in two different mills and also at the Agricultural Marketing Administration's cotton spinning laboratory at Clemson College, S. C., on portions of the stock from each of the mills involved. The stock used in these tests was a thoroughly blended mixture of 50 per cent Middling and 50 per cent Strict Low Middling, 7/8-inch staple. One portion was used as a control and the remainder was dyed into the several colors listed above.

The dyeing of the material and the manufacturing procedures are in line with the usual commercial practices followed generally in commercial plants spinning the counts of yarn on which our tests were made. Detailed information on these procedures is shown in Exhibit A and Exhibit B.

To study the effect of stock dyeings on fiber properties, we made a detailed comparison of the mean length, the upper quartile length, the coeffiicient of variation, the flat bundle strength and fineness. Tests were also made to determine chemical and mechanical damage. The results of these tests are shown in Table 1. All conclusions are based on the comparison of the dyed samples with the natural control.

Dyeing made no significant difference in the mean length or in the upper quartile length. However, there was a slight tendency for the dyed raw stock to show a decrease in the mean length, which we attribute to fiber shrinkage. The mean length and the upper quartile length increased, as the cotton was processed through the manufacturing machines, due to the removal of short fibers. This was reflected in an average increase in length of .035-inch for the spinning scavenger waste over the raw stock samples, and a lower coefficient of variability of 5.33 per cent, which is a 16 per cent reduction.

Fibrographs were run on all six stock samples by Dr. K. L. Hertel, at the Fibre Research Laboratory of the University of Tennessee, whose report is shown in Table 1-A. This report confirms the results in Table 1 as to a decrease in the mean length of fibers after dyeing. The marked difference in degree is perhaps due to optical distortion caused by the colors, as the Fibrograph is calibrated to operate on natural white cotton, or it may be due to a

*"A Study of the Effects of Extracting and Drying on the Carding and Spinning of Raw Stock Dyed Cotton," prepared and presented by the Southeastern Section of the American Association of Textile Chemists and Colorists in the Intersectional Paper Contest, Philadelphia, October 9, 1942. See page 628, December 7, 1942 issue of "American Dyestuff Reporter."

EXHIBIT A

Dyeing Procedures Used on Cotton Employed in Studying the Effects of Raw Stock Dyeing on the Processing of Cotton

Naphthol Red:

1,200 lbs. rawstock.
Boil 45 mins. with 2 lbs. Alkanol WXN.
Spring at 110 degrees F., with 33½ lbs. caustic soda (flake).
Naphtholate with 34 lbs. Naphthol AS-SW dissolved in 8 gals. alcohol and 6 pounds caustic soda (flake), and run 20 minutes. Add 225 lbs. salt, and run 40 minutes.
Blow 15 minutes.
Give salt wash (250 lbs. salt) 15 minutes.
Blow 15 minutes.
Give salt wash (250 lbs. salt) 15 minutes.
Blow 30 minutes.
Diazotize 28 lbs. Fast Red KB Base with 36 lbs. muriatic acid (18 degrees Baume), 12 lbs. nitrite of soda, 28 lbs. acetate of soda, and 12 pints of Diazopon A.
Run diazotized Base into expansion tank which contains 800 lbs. of ice and 100 lbs. of salt.
Add 2 gallons of acetic acid (56 per cent) to machine.
Couple 30 minutes at 60 degrees F.
Blow 15 minutes.
Wash cold running 15 minutes.
Wash at 160 degrees F. for 15 minutes.
Wash cold running 15 minutes.
Wash at boil 15 minutes with 5 lbs. Sulfanole K and 10 lbs. soda ash.
Wash cold running 15 minutes.
Wash at boil 15 minutes.
Wash cold running 15 minutes.
Wash at 120 degrees F. with 100 lbs. salt.
Dump.

Sulfur Blue:

1,100 lbs. rawstock.
Boil 30 minutes with 2 lbs. Sulfanole K.
Add, at 200 degrees F., 13½ lbs. Sulfogene Navy Blue 4RCF 175 per cent conc., 14½ lbs. Sulfogene Carbon HCF grains, dissolved in 22 lbs. sodium sulfide, and 3¾ lbs. acid Thaumaphos. Run 30 minutes, add 300 lbs. salt, run 15 minutes, add 3¾ lbs. acid Thaumaphos, run 30 minutes at 200 degrees F.
Drain, and blow 15 minutes.
Wash with steam and water 15 minutes.
Boil with 2 lbs. Sulfanole K 15 minutes.
Wash cold running 15 minutes.
Add 50 lbs. salt, run 15 minutes at 120 degrees F.
Blow 30 minutes.
Dump.

Vat Pastel Blue:

1,100 lbs. rawstock.
Boil 45 minutes with 3 lbs. Sulfanole K.
Spring at 120 degrees F. with 20 lbs. Liquid Levelup and 2 lbs. Alkanol WXN.
Add 5 lbs. 8 ounces Ponsol Blue BF double paste slowly, run 25 minutes, add 20 lbs. caustic soda (flake), then 20 lbs. sodium hydrosulfite, run 30 minutes at 120 degrees F.
Blow 15 minutes.
Wash cold running 15 minuttes.
Add 10 lbs. perborate of soda at 120 degrees F., run 10 minutes.
Bring to boil in 10 minutes.
Cool to 120 degrees F., add 100 lbs. salt, run 10 minutes.
Blow 30 minutes.
Dump.

Sulfur Black:

1,000 lbs. rawstock.
Standing Bath Method.
Fill up machine with standing bath liquor.
Bring temperature to 180 degrees F.
While machine is heating up—
Dissolve: 80 pounds Calcogene Black 5GLP.
60 pounds Sodium Sulfide.
8 pounds Soda Ash.
Add reduced dye to machine at 180 degrees F.
Run 20 minutes, add 50 gallons of brine (125 lbs.).
Run 40 minutes.
Pump out standing bath liquor.
Give cold running wash for 30 minutes with filtered creek water.
Drain and fill machine with soft water.
Add: 10 pounds Soda Ash.
2½ pounds Cotton Softener T.
Bring temperature to 140 degrees F.
Run 15 minutes and drop bath.
Dump.

* * *

All shades were dyed on Morton Double Circulating Raw Stock Dyeing Machines of 1,000 pounds capacity. The machines have a compressed air connection at 40 pounds pressure. Air is used to speed the removal of the dye liquor from the machine and, to a certain extent, to oxidize some types of colors.

EXHIBIT B

Manufacturing Details Used on Cottons Employed in Studying the Effects of Raw Stock Dyeing on the Processing of Cotton

Mill No. 1. (16s warp). H. & B. blending hopper. H. & B. blending hopper. Superior cleaner. Condenser. Double box baling press.

2 section one-process picker, carding beater 1,050 r.p.m. Feed roll setting, ¼-inch.

40-inch card. Cylinder speed, 165 r.p.m. Licker-in speed, 420 r.p.m. Flat speed, 3¼ inches per minute. Production, 12½ lbs. per hour.

4-roll drawing. Speed, 131 feet per minute.

10x5 long draft roving. Spindle speed 875 r.p.m. Roving twist multiple, 1.42.

10x15 long draft roving. Spindle speed 875 r.p.m. Roving twist multiple, 1.42.

Long draft spinning. 2-inch ring, 3-inch gauge. Spindle speed, 8,265 r.p.m. Twist multiple, 4.91 on white and red: 4.78 on vat and sulfur blue.

Mill No. 2. (21s warp). Two units each composed of 3 F-5 hopper feeders, feed table, two Centrif-Air machines, vertical opener, condenser, and double box baling press.

2 section one-process picker, carding beater 1,100 r.p.m. Feed roll setting, ⅛-inch.

40-inch card. Cylinder speed, 180 r.p.m. Licker-in speed, 430 r.p.m. Flat speed, 3¼ inches per minute. Production, 13 lbs. per hour.

4-roll drawing. Speed, 180 feet per minute.

12x6 slubbers. Spindle speed 700 r.p.m. 8x4 speeders. Spindle speed 1,150 r.p.m. Roving twist multiple, 1.25.

Long draft spinning. 2⅛ inch ring, 3½ inch gauge. Spindle speed 9,200 r.p.m. Twist multiple, 4.72.

Laboratory. Two processes on picker. Carding beater, 1,000 r.p.m. Feed roll setting, 3/16 inch.

40-inch card. Cylinder speed, 170 r.p.m. Licker-in speed, 435 r.p.m. Flat speed, 3¼ inches per minute. Doffer speed, 10 r.p.m.

4-roll drawing. Speed, 108 feet per minute.

11x5½ slubber. Spindle speed, 600 r.p.m. 8x4 intermediate. Spindle speed 980 r.p.m. 6x3 fine frame. Spindle speed, 1,200 r.p.m.

Regular draft spinning. 1½ inch ring. 3 inch gauge. Spindle speed 9,250 r.p.m. Twist multiple 4.70.

All samples of similar cottons were machined and tested under conditions that allow direct comparisons of results for the respective places of manufacture.

All machines were set and adjusted on the basis of staple length.

TABLE 1

Fiber Properties for the Six Samples of Cotton Employed in Studying the Effect of Raw Stock Dyeing on the Processing of Cotton

Item	*Control sample and type dyeing*					
	Control Sample	*Sulfur Navy*	*Pastel Vat Blue*	*Naphthol Red*	*Control Sample*	*Sulfur Black*
FIBER PROPERTIES:	Inches	Inches	Inches	Inches	Inches	Inches
Mean Length:						
Raw stock	.723	.737	.714	.714	.746	.689
Card sliver	.753	.752	.734	.733	.764	.713
Flat strips	.661	.632	.663	.671	.670	.644
Spinning scavenger waste (1)	.754	.739	.755	.750	.787	.742
Upper Quartile Length: (2)	Inches	Inches	Inches	Inches	Inches	Inches
Raw stock	.898	.902	.900	.905	.924	.887
Card sliver	.918	.923	.904	.915	.924	.877
Flat strips	.862	.809	.859	.857	.856	.833
Spinning scavenger waste	.902	.887	.909	.906	.944	.914
Coefficient of Variation:	Percent	Percent	Percent	Percent	Percent	Percent
Raw stock	31.67	31.17	35.16	34.23	32.25	35.71
Card sliver	29.35	29.04	31.90	31.90	28.71	31.86
Flat strips	39.68	38.23	38.26	37.10	39.50	38.63
Spinning scavenger waste	26.89	28.10	28.18	27.84	27.22	30.16
Flat Bundle Strength (3)	Index	Index	Index	Index	Index	Index
Raw stock	6.94	6.76	6.86	6.68	6.40	6.13
Card sliver	6.82	6.64	6.52	6.67	6.48	6.11
Drawing sliver	6.58	6.45	6.64	6.60	6.39	6.19
Roving	6.73	6.44	6.34	6.76	6.41	5.92
Spinning scavenger waste	6.73	6.59	6.63	6.78	6.38	5.96
Fineness:						
Surface per unit mass	2.22	2.10	2.25	2.13	2.31	2.30
Chemical Damage:	Rhes	Rhes	Rhes	Rhes	Rhes	Rhes
Cuprammonium fluidity	1.7	3.3	2.6	1.8	1.5	3.6
Mechanical Damage:						
Congo Red Stain	None	None	None	None	None	None

(1) SPINNING SCAVENGER WASTE is a loose sample of cotton fiber—collected after spinning—that has been carried through all the manufacturing processes.

(2) The UPPER QUARTILE LENGTH is the fiber length at an arbitrarily selected point in the array. It is the length which is exceeded by 25 per cent, by weight, of the fibers in the sample.

(3) The machine on which this test was made is known as the Pressley cotton fiber strength tester. Estimated round bundle strength (in thousandths of pounds per sq. in.) equals 10.8116 x flat bundle strength index—.1200.

TABLE 1-A

Fibrograph Tests on the Six Samples of Cotton Employed in Studying the Effect of Raw Stock Dyeing on the Processing of Cotton

	Control sample and type dyeing					
	Control Sample	*Sulfur Navy*	*Pastel Vat Blue*	*Naphthol Red*	*Control Sample*	*Sulfur Black*
Length:						
Mean	.68	.55	.59	.66	.66	.56
(In.)	.65	.56	.61	.65	.65	.56
Upper Half	.84	.73	.76	.81	.84	.74
Mean ..... (In.)	.82	.72	.79	.80	.84	.75

difference in light absorption on the various colors rather than to an optical distortion.

There was no significant difference in the fibre strength between the na ural and the dyed stock except in the case of sulfur black, where a 6 per cent decrease in strength was noted.

No difference was apparent between the fineness of the samples before and after dyeing.

In the cuprammonium fluidity test for chemical damage, there was no significant difference, although there was a slight tendency on the part of both of the sulfur colors to show a mild degradation.

No evidence of mechanical damage was noted on the Congo Red test.

To study the effect of manufacturing properties, we have made a detailed comparison of waste, neps per 100 square inches of card web, yarn strength, yarn appearance, and end breakage. The results of these tests are shown in Table 2. All conclusions are based on the comparison of the dyed samples with the natural control.

There was a significant increase in waste on the card, on all of the dyed samples. This is attributed to the removal of the natural waxes, causing the flats, cylinder and doffer to load more rapidly. All manufacturing tests indicated that when running dyed cotton, different settings should be used on the machines that take out waste. The close settings required for cleaning the natural cotton allowed too much good fiber to fall into waste, thus causing the loss to be higher than is normally expected. This observation has been borne out in regular mill practice in that wider settings of the working parts are necessary for dyed cotton than for the natural. A specific instance is the back plate setting of the card. In running stock dyed cotton, if the top of the back plate is set to the flats rather than to the cylinder, thereby increasing the air draft between the licker-in and the cylinder, the result is a considerable decrease in the amount and quality of the licker-in and cylinder waste.

There was a significant increase in the neps per 100 square inches in the card web on the stock dyed cotton, particularly in the heavier shades.

The yarns from the natural cotton, the pastel vat blue, and the sulfur navy samples did not reflect a significant

TABLE 2

Manufacturing Properties for the Six Samples of Cotton Employed in Studying the Effect of Raw Stock Dyeing on the Processing of Cotton

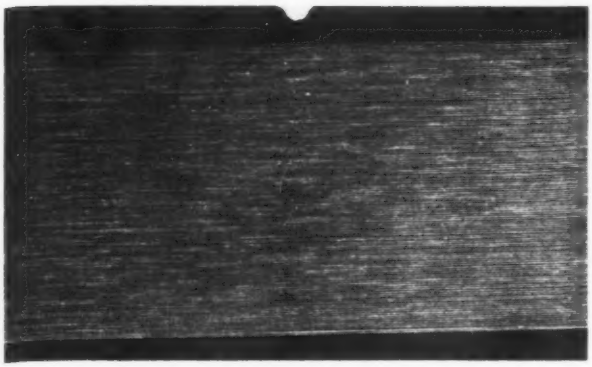
Item	*Control sample and type dyeing*					
	Control Sample	*Sulfur Navy*	*Pastel Vat Blue*	*Naphthol Red*	*Control Sample*	*Sulfur Black*
MANUFACTURING PROPERTIES:	Percent	Percent	Percent	Percent	Percent	Percent
Waste:	4.46	3.95	4.56	6.04	4.63	7.88
Pickers						
Card Waste:	3.26	3.36	3.30	4.12	3.16	4.11
Flat strips	.76	.80	.84	.96	.90	1.10
Cylinder and doffer strips	2.60	2.69	2.33	2.20	2.18	2.05
Motes and fly						
	6.62	6.85	6.47	7.28	6.24	7.26
Total card waste	10.78	10.53	10.73	12.88	10.58	14.57
Total picker and card waste*	6	19	8	13	8	22
Neps per 100 sq. in. of card web	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Yarn strength:	113.2	116.0	114.9	119.4	114.3	103.7
16s	83.7	84.1	82.5	87.6	83.8	74.2
22s						
Yarn strength index (1)	86.9	89.1	88.2	91.7	97.2	88.2
16s	93.3	93.8	92.0	97.7	104.0	92.1
22s						
Yarn appearance: (2)	B+	C	B	C+	B+	B—
16s	B	C	B	C	B+	C+
22s	—	—	—	—	Normal	High to excessive
End breakage						

* Based on net weight of cotton fed first picker.

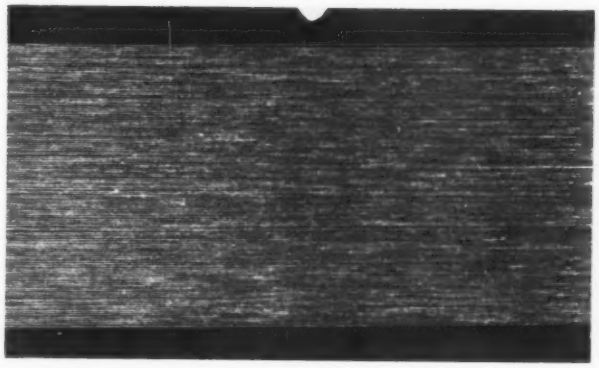
(1) A strength index is obtained by determining the percentage that the strength of a given yarn is of an average value obtained from the following equation: $S = \frac{428.69 - 2145.18L - 18.142C}{C}$ in which S is the skein strength of carded yarn in lbs., L is the staple length of the cotton in inches, and C is the count of the yarn.

(2) Yarn may range from "A+" to "D—" in appearance. As a general rule, in yarns of approximately 20s to 30s count, "B" is the lowest grade that may be considered satisfactory for most types of carded yarns, and a yarn graded as "B+" or above is usually desired for goods in which appearance is an important factor.

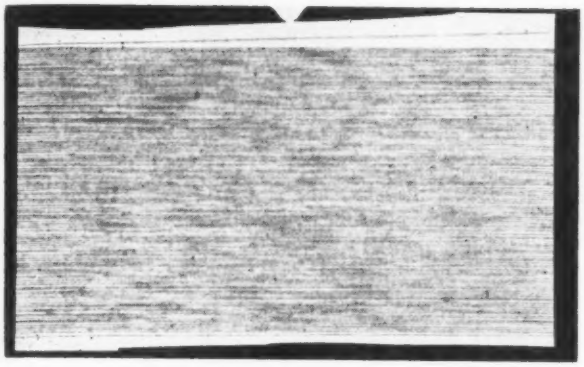
EXHIBIT C



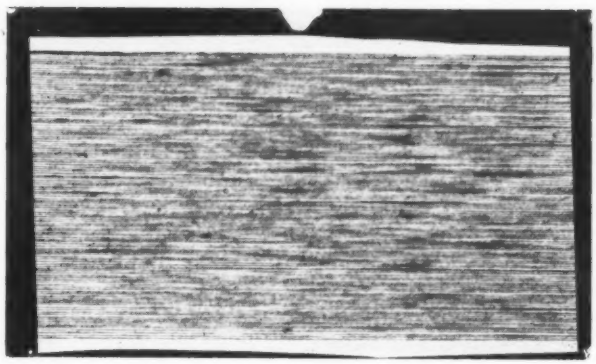
No. 2—Natural Control—16s.



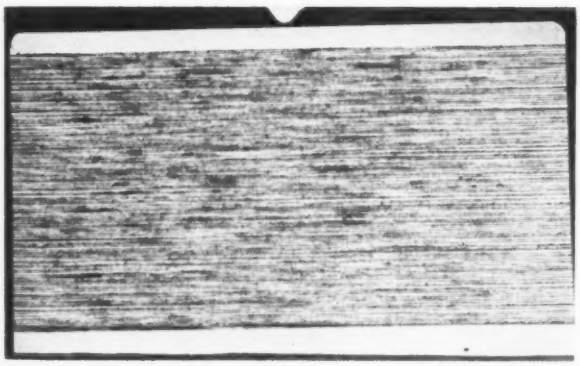
No. 1—Natural Control—16s.



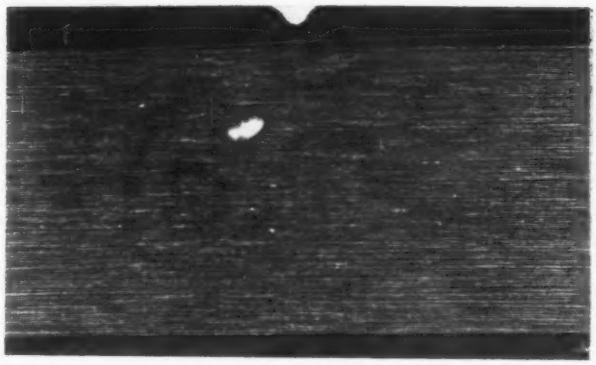
Naphthol Red—16s.



Sulfur Navy—16s.



Sulfur Black—16s.



Vat Pastel Blue—16s

difference in yarn strength. There was a tendency on the part of the naphthol red to give an increase in strength. There was a significant decrease in strength on the yarns from stock dyed sulfur black.

There was a significant decrease in the quality of the yarn appearance on all of the dyed cottons, which is shown clearly in the photographs in Exhibit C.

End breakage tests were run only on the sulfur black and the natural control, since sulfur black was the only stock dyed color which showed a marked deterioration in fiber strength. There was a significant increase in the end breakage on the roving and spinning frames which would be expected in view of the loss in fiber strength.

After interpreting the results in Table 2 on Manufacturing Properties, we devised a test to determine the difference in the effect of the dyeing procedures and the actual dyestuff.

This was done by running two comparable batches, one of which was an actual dyeing, the other being subjected to the same operations with the dyestuff and chemicals omitted. The results obtained are shown in Table 3. These

(Concluded on Page P538)

Intersectional Contest—

ARALAC

Presented for the Rhode Island Section

by FREDERIC A. PRISLEY
Watson-Park Co.

COMMITTEE
Frederic A. Prisley, Chairman, Watson-Park Co.
Robert Joerger, Hope Webbing Co.
Duncan G. Carmichael, Aralac Corp.
Charles Sedgwick, Esmond Mills.
George Wood, Apponaug Co.

THE members of the Rhode Island Section have for a long while wished to pay a tribute to a highly creditable development which has taken place within the geographical limits of the section. We are referring to the manufacturing process which converts casein into a fiber which has been found to be useful, when blended with other fibers, in the production of women's wear including sportswear, outer garments, suitings, sweaters, and hosiery. This fiber is used by itself as a filler in pillows, mattresses, comforters, quilted goods and as the chief component of garment interlinings.

Until 1940 casein fiber had been manufactured only in Europe and we believe that the bulk of the fiber seen in this country before that time originated in Italy, where Snia Viscosa had reached a production of 30 million pounds yearly, according to the last reports available.

The domestic production of this fiber started in Bristol, Rhode Island, and when more space was needed to meet production requirements, the plant was moved to Taftville, Connecticut.

We will not include in this paper any history of the chemistry involved in the production of a textile fiber from casein because of the many papers already in the literature.

With respect to availability, which is the leading question in connection with any material these days, it must be pointed out that domestic casein is not now as freely available as it is during normal times.

That portion of the skim milk produced which normally is converted into casein is now being drawn upon for additional skim milk powder for food purposes. The Government Milk Conversion Program has set the prices on skim milk powder purposely high enough to insure that an adequate amount is diverted to food products. This situation, combined with other factors, has necessitated the importation of quantities of Argentine casein for fiber manufacturing purposes. Statistics of dairy industry production would seem to show, however, that fiber production will never suffer any serious curtailments for lack of casein.

We propose during the time allotted to illustrate some of the chemical and physical characteristics of this casein fiber by tracing the steps necessary to manufacture a men's wear worsted fabric; which hypothetical fabric will contain 40 per cent Aralac, 60 per cent wool. By so doing we hope to translate some of the attributes of casein fiber in terms of the mechanical and chemical operations required to produce a cloth from those fibers. We believe that most of the following has not been previously printed and it is largely based on facts brought out by mill scale production of fabrics similar to the one to be discussed.

Aralac for the textile trade is ordinarily supplied as staple fiber. It is understood by all, of course, that the individual fibers are produced by wet spinning similar to the viscose process, but it is seldom marketed in continuous filament form.

The fiber is manufactured in three diameters, which for the wool trade are called 20 micron, corresponding to 70s wool; 25 micron, or 60s grade, and 30 micron or 50s. The diameters for each grade do not vary over 13 per cent from standard at the present.

The fiber is cut to any length from one-half inch to six inches by one-half inch graduations, to suit various requirements for spinning.

For our fabric we shall use a 62s wool, and if Bradford spun, the Aralac best suited for blending with that grade will be 5½ inch staple in the 25 micron grade. It is recommended that the Aralac be a trifle coarser than the wool in this case. If the yarns are to be French Spun, then a 4 inch staple in the 20 micron or 70s grade will be suitable. For the stock dye fabric the Aralac fiber is carded and combed before dyeing. The yield from the bale to the Bradford Top according to present experience will be 88 to 90 per cent. The noil runs from 8 to 10 per cent with 1 or 2 per cent of card and comb waste. The French top yields 90 per cent or a little better, the noil in this case averages 7-8 per cent. The controlling fiber characteristic here is the strength of the Aralac, which is only 70 per cent that of wool in the dry state.

The fiber lubrication should be carried out just as it is for the worsted top, but more oil may be found necessary in cold, dry weather because Aralac is more readily charged with static electricity.

The Aralac top is dyed with due regard for two of its properties. The fiber wets readily and will pack harder than a worsted top and it is recommended that the top be wound with less tension, for the sake of proper circulation

in the top machine. The reason for the packing is probably due to the fact that Aralac fiber reaches its maximum swelling at a much lower temperature than does wool.

The metallized dyestuffs have been used extensively on Aralac, and the following will illustrate a normal dyeing procedure for a light shade.

The fiber is produced in an acid state just below 4 pH and the dyeing should be handled about as follows: All pre-scouring before dyeing should be omitted, and the fiber instead neutralized with 2-3 per cent disodium phosphate at 90° for 10 to 15 minutes. Then without any rinse, the dyestuff and Glauber's salt, omitting any acid, are added and the dyeing carried out at a temperature between 180° and 200°.

For medium and heavy shades the neutralization can be omitted and 3 per cent of sulfuric acid is included in the dye bath, with the dyeing temperature at 200°.

The usual menswear chrome dyestuffs may also be used by the top chrome method. The fiber is neutralized as when dyeing with the metallized colors, and it is recommended that 1 per cent of synthetic detergent material be included in the neutralizing bath.

The dyestuff and Glauber's salt are added, and 3 per cent of acetic 56 per cent strength plus an addition of 1 per cent formic used to exhaust before chroming. Any milling colors used for shading should be selected for light fastness and particularly for wash fastness.

The dyed fiber and wool are then blended in the usual manner in mixing gills and the blend recombed if the mill practice requires it; if not, the blend is made into top and sent to the drawing.

From the drawing through to weaving the sliver and yarn is processed exactly as straight worsted, without any mechanical change in equipment or any changes in draft, ratch, or twist.

The weaving operation may require a change from usual practice. If the filling yarn made from the blend be too kinky for good weaving, then unsatisfactory results will follow if the yarn is steamed or wet with direct application of moisture. It is preferable to expose the yarn to an atmosphere of high humidity until it is conditioned properly for weaving.

The ordinary finishing procedures may be followed, with some precautions to compensate for the wet strength of Aralac which is only 30 per cent of the strength of wool. But it should be emphasized here that a blend of Aralac and wool will felt faster than the same wool by itself, although Aralac itself has no felting qualities.

Because of the increased felting of wool and Aralac blends, the finisher will no doubt get any finish required in the washer without any fulling as such. The wet processes should be controlled carefully with respect to alkalinity and temperature because the Aralac as stated before is more sensitive to high pH than wool, and also because generally speaking the fastness of dyestuffs to wet processing is less on Aralac than on wool. The final wet operation should include very careful rinsing to eliminate all alkali. It might be well to acidify the final bath with acetic acid. This has been suggested for all worsted fabrics and certainly should eliminate variations in quality of Aralac-wool blends. The fabric may be carbonized without damage to the Aralac content, provided that baking temperatures are not excessive.

The piece drying must be handled with due caution paid to temperature and tension. Various constructions will require different handling, of course, but the lack of strength in the wet Aralac must be given careful consideration when the dryer widths are set. The fabric layout must allow for Aralac-wool cloths being of necessity dried narrower than corresponding all-worsted fabrics. While it is true that all-worsted fabrics should be dried slowly and at temperature not much greater than 212°, it is most important for the handle of fabrics containing Aralac.

It should be pointed out that goods containing Aralac will shrink more in sponging than those of all worsted, and the layout must include provision for it.

So far as finished weights are concerned, the regain for Aralac under standard atmospheric condition is 12.6 per cent, so no difficulty will be encountered with variations of weights from all worsted fabrics.

A piece-dye cloth to be made 40 per cent Aralac and 60 per cent wool can be dyed solid shades, with the usual chrome dyestuffs used for worsted top chrome piece dyes.

After seeing dyeings made on wool-Aralac combinations, we believe that there are possibilities for two-color effects dyed piece dye because of the different affinity for dyestuff between the two fibers. There are many kinds of contrasts that could be worked out and there is good reasons to believe that the control would not be too difficult. With a combination of pattern and color, very interesting effects can be readily visualized.

The finished fabric we can expect to be not too different from an all worsted, with respect to consumer reaction. A man should be just as warm in a fabric containing Aralac, his suit should not require pressing unusually often, and the dry cleaners' solvents will not injure it. The colors in the Aralac will not fade any sooner than the colors in the wool. Unfortunately, moths and carpet beetles will consume casein fiber, and mildew will attack it just as wool.

We would like to close by restating a fact which seems to us to be important. Should Aralac combinations be found wanting in some particular requirement, there are possibilities that the manufacturers of the fiber may be able to change the characteristics of Aralac to meet a given situation.

As an example, Aralac has greater resistance to water and heat than is possessed by any other casein fiber. This improvement over European casein fibers was not accidental, but rather the result of research on that particular characteristic.

Intersectional Contest—

A Proposed Method for the EVALUATION OF DETERGENTS

V. B. HOLLAND AND ALICE PETREA, Junior Author
Cannon Mills Co.

Presented for the Piedmont Section

by R. HOBART SOUTHER
Proximity Print Works

COMMITTEE
R. Hobart Souther, Chairman, Proximity Print Works.
V. B. Holland, Cannon Mills Co.
M. D. Haney, Jr., Fine Chemicals Division, E. I. duPont de Nemours & Co., Inc.

1. INTRODUCTION

THE need for a recognized method of evaluating detergents is eminent. Consumers, as well as manufacturers, of detergents have long been aware of the need for a standard procedure for the evaluation of detergents and a large amount of work has been carried out without much success. In almost every project, the investigation has been given up or regarded as impractical. In a recent survey by Crowe and associates[1] in attempting to evaluate synthetic deteregnts, the conclusions were drawn that "the best method to date of evaluating synthetic detergents for a specific application is under the actual operating conditions where they are to be used." In this investigation, standard soiled wool and cotton fabrics were washed in launderometers with the detergents in question, and graded on photometers. One of the outstanding difficulties reported was reproducibility of results between different laboratories and in some instances, between the individual tests of a single laboratory.

A previous project, which is probably the first of note, was that of the Detergents Committee of the American Oil Chemists Society[2] to evaluate the detergent properties of soap by means of standard soiled cloth in launderometers. This investigation was abandoned in that the Committee felt that this method was impractical as a general method for evaluating detergents, but did have some merit for comparative work where the conditions were limited. Since that time, almost all investigations regarding measurement of detergency have been based on the soiled cloth-launderometer method wherein the washed samples were measured for their whiteness or reflectivity to ascertain soil removal. Some modifications have been introduced here and there, but basically the methods are the same.

In this study, the writer will attempt to present some of the theoretical aspects of detergency as brought out by previous workers, and a proposed method for the evaluation of detergents with the hope that it will contribute in some measure toward the establishment of a standard procedure.

2. SOME ASPECTS OF DETERGENCY

In the textile industry, the fundamental purpose of a detergent is the removal of oil or fatty matter from a yarn or fabric, or more specifically, a fiber. In laundry processes, the principal use of a detergent is the removal of a general class of substances that may be classified as "dirt." Usually "dirt" is bound to the material to be washed or processed by means of oil or some fatty matter which reverts the purpose of the detergent back to a principal object of removing oil. Robinson[3] brings out that the initial stage of detergent action is the displacement of the oil on the fiber by the detergent solution and that the oil might be displaced without being emulsified. Under such a condition, the oil would collect on top of the solution or might even be redeposited back onto the fibers and here is where the emulsification functions. Evidence is also given which indicates that different detergents are absorbed in varying degrees by the same fiber and that the same detergent may be absorbed differently by unlike fibers.

Hartley[4] finds that solutions of soaps, and of the newer synthetic detergents, have a solvent action on organic substances which is quite distinct from the emulsifying action which they also may possess. It is further suggested that this solvent action may have a direct function in detergency, namely, the solution of part of the oily matter of "dirt" by the soap or detergent solution.

Considering the variables involved, the mechanism of

[1] Crowe, J. B.: Cooperative Studies on a Laboratory Method for Evaluating Synthetic Detergents. Amer. Dyestuff Reptr., Vol. 32, No. 11, P. 237 (1943).

[2] Oil and Soap, Vol. 10, P. 232 (1933).

[3] Robinson, Conmar: The Mechanism of Detergent Action: Wetting and Detergency, P. 137, Chem. Publishing Co., N. Y. (1939).

[4] Hartley, G. S.: The Solvent Action of Detergent Solutions: Wetting and Detergency, P. 153, Chem. Publishing Co., N. Y. (1939).

detergent action is a complex one. The nature of the detergent, of the surface to be cleaned, of the dirt on the surface, and the action the detergent may have on the fabric presents a most difficult problem in evaluating a detergent by a standard procedure for every specific use that arises and it can well be appreciated why previous workers have regarded it as impractical and well nigh impossible.

As has been found in other investigations, the writer does not believe that the usual soiled cloth-launderometer method will ever suffice as a method for measuring detergency because it only measures or considers one function of a detergent which is largely its emulsifying power. Of course, some displacement and solution is involved, but the method principally has to do with the measuring of the carbon particles that have been emulsified and carried off by the detergent. Not only that, but the removal of the carbon particles does not necessarily mean that a particular detergent is more efficient than another. Consequently, the writer proposes to measure quantities other than reflectivity as a means of characterizing a detergent.

The method we propose is to put a measured quantity of soil on a sample of cloth, launder the sample under suitable conditions with the detergent in question and by weighing the laundered sample determine the quantity of soil removed by the action of the detergent. Along with this measurement of soil removal, the reflectivity or brightness increase brought about by laundering should be ascertained as in the methods of previous workers. For further information, and to obtain a more complete picture, extraction of the washed sample would be carried out to determine the amount of oils and fats remaining after treatment with the detergent. Such a procedure certainly has merit over the methods of previous investigators.

EXPERIMENTAL METHOD

Fabric

Bleached and desized 64 x 64 muslin sheeting—sized 4 inches by 4 inches and overedged (Note 1).

Standard Soil

89.0% Stoddard Solvent
2.5% Vaseline
2.5% Paraffin Wax
2.5% Stearic Acid
2.5% Oleic Acid
1.0% Norit C

Method of Soiling

A prepared sample of the fabric is dried to constant weight at 105° C. It is placed in a standard Launderometer jar containing 100 grams of standard soil (Note 2) and 10 ¼-inch steel balls. The jar is run in the launderometer at room temperature for 60 minutes. The sample is removed, allowed to drain, dried flat on a wire rack in the steam oven at 95 to 100° C. for about 30 minutes. After removing from oven and cooling, the soiled cloth is brushed vigorously with a stiff fiber brush to remove all loosely adhering carbon particles. The sample is dried to constant weight and per cent soil on fabric calculated. Then the reflectivity is determined by means of a Zeiss Pulfrich Photometer in which an average of six readings is taken. Any suitable reflectometer may be used here.

Method of Evaluating Detergency

Varying concentrations of detergents in distilled water as desired, are heated to approximately 160° F. and 200 ml. are placed with a soiled sample and 10 ¼-inch steel balls in a Launderometer jar. This is run at 160° F. for 45 minutes in the Launderometer. Then the samples are rinsed at 140° F. with 200 ml. water, giving 50 double shakes by hand, and followed by two cold rinses of 200 ml. each of 50 double shakes. The soiled cloth is run through the wringer and dried to constant weight. The per cent of soil laundered out is calculated and the reflectivity measured as before. In every case, four duplicates are run.

Where more complete information is desired, the laundered samples are extracted for three hours in soxhlets with ethyl ether. The per cent extractable matter remaining after laundering is determined on the basis of the weight of the soiled sample. For more detailed information, the pH of each detergent solution was determined before laundering.

Note 1. Overedging is to be preferred to hemming, since it was found that the carbon particles tended to build up under the folds of the hems.

Note 2. It was found that the carbon settled rather rapidly so a stock solution was made up of the fats, oils and solvent, and 1 gram of Norit C added to each Launderometer jar when the tests were made up.

RESULTS

Detergent	*pH*	*% Soil Added*	*% Soil Removed*	*% Brightness Increase*	*% Oil in Sample After Laundering*
.10% Sodium Oleate	9.95	15.49	41.12	9.47	
.10% Sodium Oleate	9.95	16.87	45.25	10.00	
.10% Sodium Oleate	9.95	16.96	47.37	9.68	14.96
.10% Sodium Oleate	9.95	16.58	48.99	9.90	12.50
.25% Sodium Oleate	10.05	16.35	68.50	15.13	
.25% Sodium Oleate	10.05	17.73	84.73	20.72	
.25% Sodium Oleate	10.05	18.20	77.80	16.38	3.50
.25% Sodium Oleate	10.05	18.25	75.18	15.53	4.32
.50% Sodium Oleate	10.15	15.69	78.33	17.12	
.50% Sodium Oleate	10.15	17.83	82.96	17.34	3.69
.50% Sodium Oleate	10.15	16.27	80.57	18.11	
.50% Sodium Oleate	10.15	19.71	82.18	16.59	3.54
.75% Sodium Oleate	10.20	16.90	80.20	17.45	3.41
.75% Sodium Oleate	10.20	17.19	80.92	19.15	2.89
.75% Sodium Oleate	10.20	17.48	78.80	16.27	
.75% Sodium Oleate	10.20	16.55	82.51	17.87	
.25% Sulfonated Castor Oil #1.	7.05	18.74	36.78	5.53	9.54
.25% Sulfonated Castor Oil #1.	7.05	16.83	22.77	2.66	
.25% Sulfonated Castor Oil #1.	7.05	18.25	36.03	4.25	9.34
.25% Sulfonated Castor Oil #1.	7.05	18.11	32.15	4.15	

RESULTS, (Cont.)

Detergent	pH	% Soil Added	% Soil Removed	% Brightness Increase % Oil in Sample After Laundering	
.50% Sulfonated Castor Oil #1.	7.28	17.16	34.56	4.36	9.44
.50% Sulfonated Castor Oil #1.	7.28	18.00	35.62	6.28	9.09
.50% Sulfonated Castor Oil #1.	7.28	16.82	27.15	5.00	
.50% Sulfonated Castor Oil #1.	7.28	17.96	32.98	5.32	
.75% Sulfonated Castor Oil #1.	7.40	16.13	45.84	10.52	7.46
.75% Sulfonated Castor Oil #1.	7.40	16.54	39.84	7.08	
.75% Sulfonated Castor Oil #1.	7.40	16.71	43.77	8.92	7.54
.75% Sulfonated Castor Oil #1.	7.40	15.72	35.87	7.87	
1.0% Sulfonated Castor Oil #1.	7.52	17.69	40.53	7.71	
1.0% Sulfonated Castor Oil #1.	7.52	16.85	44.00	8.44	
1.0% Sulfonated Castor Oil #1.	7.52	17.23	36.77	7.56	8.35
1.0% Sulfonated Castor Oil #1.	7.52	15.75	37.82	6.77	7.79
.25% Sulfonated Castor Oil #2.	7.8	16.25	39.81	10.64	
.25% Sulfonated Castor Oil #2.	7.8	15.20	39.24	7.13	
.25% Sulfonated Castor Oil #2.	7.8	15.05	38.52	8.06	
.25% Sulfonated Castor Oil #2.	7.8	14.43	37.52	7.23	
.50% Sulfonated Castor Oil #2.	7.97	15.13	46.49	10.02	
.50% Sulfonated Castor Oil #2.	7.97	15.66	44.91	9.09	
.50% Sulfonated Castor Oil #2.	7.97	16.38	46.03	8.37	
.50% Sulfonated Castor Oil #2.	7.97	14.76	41.82	10.44	
.75% Sulfonated Castor Oil #2.	8.05	15.65	46.01	9.92	
.75% Sulfonated Castor Oil #2.	8.05	16.53	38.64	5.17	
.75% Sulfonated Castor Oil #2.	8.05	18.09	42.10	5.68	
.75% Sulfonated Castor Oil #2.	8.05	17.78	41.71	9.16	
1.0% Sulfonated Castor Oil #2.	8.10	17.17	51.68	12.78	
1.0% Sulfonated Castor Oil #2.	8.10	18.08	45.51	12.36	
1.0% Sulfonated Castor Oil #2.	8.10	18.58	45.21	11.13	
1.0% Sulfonated Castor Oil #2.	8.10	17.34	41.58	9.69	
.10% Sodium Alkylaryl Sulfonate	5.8	16.34	21.91	5.32	
.10% Sodium Alkylaryl Sulfonate	5.8	18.24	24.91	5.32	
.10% Sodium Alkylaryl Sulfonate	5.8	18.55	14.03	3.51	12.00
.10% Sodium Alkylaryl Sulfonate	5.8	17.97	14.95	2.66	12.75
.25% Sodium Alkylaryl Sulfonate	5.83	17.14	48.52	11.38	
.25% Sodium Alkylaryl Sulfonate	5.83	17.19	44.19	7.12	7.44
.25% Sodium Alkylaryl Sulfonate	5.83	16.59	43.94	8.51	7.35
.25% Sodium Alkylaryl Sulfonate	5.83	16.44	49.07	11.41	
.50% Sodium Alkylaryl Sulfonate	5.84	17.88	62.95	9.04	
.50% Sodium Alkylaryl Sulfonate	5.84	16.96	55.46	7.76	
.50% Sodium Alkylaryl Sulfonate	5.84	16.60	59.76	9.37	5.74
.50% Sodium Alkylaryl Sulfonate	5.84	15.53	58.23	8.08	6.06
.50% Sodium Alkylaryl Sulfonate	10.0	15.61	70.04	13.75	3.77
.50% Sodium Alkylaryl Sulfonate	10.0	15.40	69.71	11.87	
.50% Sodium Alkylaryl Sulfonate	10.0	17.47	68.90	8.96	
.50% Sodium Alkylaryl Sulfonate	10.0	16.47	69.77	13.96	3.75
.75% Sodium Alkylaryl Sulfonate	5.85	16.45	75.88	13.40	
.75% Sodium Alkylaryl Sulfonate	5.85	15.05	71.64	10.83	
.75% Sodium Alkylaryl Sulfonate	5.85	14.98	74.42	11.88	4.06
.75% Sodium Alkylaryl Sulfonate	5.85	16.66	75.47	12.60	3.85
.10% Fatty Alcohol Sulfate	7.5	15.75	21.60	4.83	10.62
.10% Fattl Alcohol Sulfate	7.5	14.69	21.20	2.98	10.03
.10% Fatty Alcohol Sulfate	7.5	14.67	16.60	5.20	
.10% Fatty Alcohol Sulfate	7.5	15.02	16.54	3.09	
.25% Fatty Alcohol Sulfate	8.1	13.75	46.62	6.98	6.70
.25% Fatty Alcohol Sulfate	8.1	14.19	37.29	5.70	
.25% Fatty Alcohol Sulfate	8.1	15.70	51.02	8.54	
.25% Fatty Alcohol Sulfate	8.1	15.82	48.26	7.82	6.69
.50% Fatty Alcohol Sulfate	8.42	14.96	66.78	13.46	
.50% Fatty Alcohol Sulfate	8.42	15.17	65.42	15.01	
.50% Fatty Alcohol Sulfate	8.42	15.42	64.10	15.11	4.83
.50% Fatty Alcohol Sulfate	8.42	15.19	64.50	13.28	4.60
.75% Fatty Alcohol Sulfate	8.72	14.50	70.10	16.16	3.85
.75% Fatty Alcohol Sulfate	8.72	14.99	70.50	18.50	3.49
.75% Fatty Alcohol Sulfate	8.72	15.14	74.00	19.45	
.75% Fatty Alcohol Sulfate	8.72	16.02	73.70	17.98	
.10% Synthetic	6.3	17.52	7.73	2.45	
.10% Synthetic	6.3	17.43	6.86	2.12	
.10% Synthetic	6.3	19.76	9.77	2.66	
.10% Synthetic	6.3	18.68	8.31	2.24	
.25% Synthetic	6.85	19.16	4.00	1.38	
.25% Synthetic	6.85	19.66	5.99	1.16	
.25% Synthetic	6.85	17.07	2.02	0.96	
.25% Synthetic	6.85	19.24	4.83	1.28	
.50% Synthetic	7.7	17.01	*4.91	2.45	
.50% Synthetic	7.7	18.38	*7.00	1.39	
.50% Synthetic	7.7	17.21	*4.90	0.74	
.50% Synthetic	7.7	17.99	*7.16	1.81	
.75% Synthetic	8.7	19.03	*6.57	1.70	
.75% Synthetic	8.7	18.91	*8.64	0.32	
.75% Synthetic	8.7	18.33	*6.34	2.23	
75% Synthetic	8.7	15.70	*17.17	1.70	
.10% Sodium Resinate	9.1	16.15	32.82	8.75	8.45
.10% Sodium Resinate	9.1	16.29	30.31	7.61	8.63
.10% Sodium Resinate	9.1	17.92	35.00	6.46	
10% Sodium Resinate	9.1	16.19	40.25	6.35	
.25% Sodium Resinate	9.6	16.38	40.63	8.02	7.38
.25% Sodium Resinate	9.6	16.65	36.54	7.29	7.88
.25% Sodium Resinate	9.6	17.25	39.67	8.02	
.25% Sodium Resinate	9.6	17.39	31.82	7.08	
.50% Sodium Resinate	9.97	17.74	54.48	8.12	6.17
.50% Sodium Resinate	9.97	17.22	47.84	8.75	6.20
.50% Sodium Resinate	9.97	17.30	46.52	9.37	
.50% Sodium Resinate	9.97	15.30	35.58	7.92	
.75% Sodium Resinate	10.1	18.11	45.95	7.40	
.75% Sodium Resinate	10.1	16.84	49.83	9.27	5.98
.75% Sodium Resinate	10.1	16.73	43.53	9.58	6.91
.75% Sodium Resinate	10.1	14.13	35.91	7.81	

*These figures show per cent increases of soil rather than soil removal.

RESULTS, (Cont.)

Detergent	pH	% Soil Added	% Soil Removed	% Brightness Increase	% Oil in Sample After Laundering
Water		17.03	24.47	5.67	
Water		18.05	28.91	6.80	
Water		17.40	28.76	6.53	
Water		16.32	25.63	6.29	

DISCUSSION

It should be stated that it is the writer's intention to show the possibilities of a proposed method for evaluating detergency under certain conditions and not to disparage or promote the merits of certain types of detergents. The products shown in the table were selected at random from numerous samples on the shelves of the laboratory in which the tests were conducted.

Under the conditions of the soiling procedure and the fabric employed, the quantity of soil applied ranged from 14.5 to 19.5%. However, differences among checks were small enough for the results to be classed as quantitative. In some instances, duplicates did not check close enough for satisfactory results, but this usually occurred when the concentration of the detergent was insufficient for optimum soil removal.

As would be expected, the per cent of soil removed and brightness increases with the concentration of the detergent until a point of saturation is reached at which these characteristics level off and no further soil is removed. This suggests a possible means by which the optimum concentration of a detergent for removing a specified soil under specific conditions may be ascertained.

Time did not permit tests with other fibers, but undoubtedly, a detergent should be evaluated with the fiber upon which it is to be used. Likewise, in setting up standard conditions more than one set or class of conditions should be used; namely, in the presence of acid, alkali or hard water. It is needless to mention that under any of these specific conditions one detergent may be considerably more efficient than another. The same is true with the nature of the soil employed which may be set up to meet the individual or more general requirements. This is indicated in the Table of Results with 0.5% Sodium Alkylaryl Sulfonate solutions wherein the detergency was increased by raising the pH from 5.8 to 10.0.

It is significant that a 0.25% solution of Sulfonated Castor Oil #1 gives lower soil removal and reflectivity than 0.10% Sodium Oleate, yet removes appreciably more oil than the soap. This is further evidence that a measurement of reflectivity alone is not enough for the evaluation of a detergent.

The writer acknowledges that determination of soil applied, per cent removed, brightness increase, etc., should be carried out on all types of fibers as well as the various conditions under which the detergents are to be used, but basically, the procedure will be the same as far as manipulation and measurement is concerned. Consequently, the results should be comparable to those shown here.

This method has certain advantages over those of previous workers in that the Launderometer is used for applying the soil and no special wash-wheel or set-up is required. In addition, measurement of the soil applied insures a more uniform and controlled test fabric.

CONCLUSIONS

The writer admits that the method as brought out above may be subject to some modifications, but concludes that the procedure has merit over and greater possibilities than methods investigated by previous workers. This has been brought about by easier manipulation, greater control in soiling the fabric, and the measurement of properties heretofore not considered.

The number of textile mills and laboratories having suitable equipment for measurement of reflectivity is relatively very small. Therefore, the use of reflectivity as a means of evaluating detergency is not adaptable to a large majority of the consumers of detergents. With this in mind and in view of the results obtained with the procedure above, the writer concludes that measurements of per cent soil removal and extractable matter are sufficient in most cases for a suitable evaluation of detergency.

Acknowledgment is to be made to Dr. J. H. Shipp of the duPont Technical Laboratory for the use of a Ziess Pulfrich Photometer.

MEMBERSHIP
APPLICATION BLANKS
for individual
and corporate
MEMBERSHIP
may be obtained
from the secretary

Dr. H. C. CHAPIN
Lowell Textile Institute, Lowell, Mass.

Full-Fashioned Hosiery—

(Concluded from Page P526)

However, I believe with the above facts one can quickly arrive at the right amount to use in their own plant.

Pressure creates wrinkles in any fabric, so we are careful to avoid this in the extraction. Centrifugal force is very strong in an extractor. We line ours only one bag thick around the out-side walls. Only the weight of the hose in one bag are against each other.

The speed is brought up slowly and below the top point of highest speed, the switch is pulled and the extractor coasts down to a standstill. We are helped by the fact that acetate does not absorb or retain water easily. Get your goods into the boarding as wet as they can be handled. The care with which they are extracted will save a lot of wrinkles.

The boarding department follows, keeping the boards as cool as possible. They should be processed through boarding soon as possible. Bags should not be allowed to rest on top of each other in the goods trucks before boarding. Wrinkles are the reward for disobeying this.

The remainder of the finishing operations are more or less routine.

At this time I want to briefly high-light some of the foregoing procedure so that if you are a beginner with acetate, you may profit from our experience and mistakes.

Pre-boarding is most important. Avoid too high a temperature because of loss of tensile strength and too much delustering. Dye absorption becomes uneven with higher pre-boarding temperature.

Watch the pre-boarding machine and see that the air vents out of it ahead of the steam. If your machine is not so equipped, whenever the steam enters, the air is trapped above it and you have hose with a change of color range from top to bottom. This shading off effect is partial pre-boarding. Your pre-boarder operators must watch the steam pressure or temperature regulation to see that it is always uniform. Fluctuations will give you a different dye effect for each dozen with shading inevitable when pairing.

Do not crowd dye bags or overload the machine. The maximum dye temperature you decide upon must not be exceeded in order to preserve your set and shape.

Avoid pressure marks in every processing operation by keeping weight off the hose.

Acetate colors are more or less painted on, being insoluble in water. Therefore, a dispersing agent such as a soap or sulfonated oil, carries them through the bath and disperses. The rate of dispersion is governed by the fineness with which some have been ground. Therefore, exhaustion occurs at different temperatures for each color. A loss of as much as 30 per cent in shade may occur if the bath is permitted to cool down at certain stages. When the pasted colors are mixed with water preparatory to putting in bath, always use same temperature of hot water. This seems to make for uniform dispersion.

In conclusion I wish to state that the procedure as given above should be of practical value to one just starting in the processing of acetate rayon. In a scientific way I have tried to exhaust the possibilities from the highest to lowest temperatures practical. For our conditions, I found the happy medium of best results.

Raw Stock Dyeing—

(Concluded from page P531)

results show that both the dyeing procedure and the dyestuff itself have a detrimental effect on the yarn quality and manufacturing performance.

TABLE 3

Results of Test of Manufacturing Properties of Cotton Run in Natural State, After Wetting-out Without Dyeing, and After Wetting-out and Dyeing with Sulfur Black

	Control sample (Natural)	*Control Sample (Wet-out only)*	*Dyed (Sulfur Black)*
Flat strips	2.90%	3.03%	3.03%
Cyl. and Doffer strips.....	.93%	.95%	.95%
Nep count (neps per 100 sq. in. in card web)	19	31	43
Roving frame ends down per 1,000 spl. hours	Normal	Normal	Increased over normal
Spinning ends down per 1000 spindle hours	Normal	Normal	Increased over normal
Skein breaking strength.....	101	101	86
Single end breaking strength.	.86	.90	.77

(This test was made on Low Middling western cotton.)

CONCLUSION

The data in these experiments bring out the following effects between the dyestuff and the dyeing procedure on the manufacturing properties of cotton:

1. Increase in card waste.
2. The degradation of carding quality as indicated by nep count.
3. Decrease in yarn quality as reflected by the grading tests for yarn appearance.

In the case of the sulfur black the data in these experiments bring out the following effects on the manufacturing properties of the cotton in addition to the items listed above:

1. Decrease in fiber strength.
2. Decrease in fiber length.
3. Evidence of chemical damage.
4. Increase in ends down in the roving and spinning operations.

This study isolates the adverse effects in manufacturing performance and yarn quality, occurring on raw stock dyed cotton, and shows emphatically that these adverse effects are traceable directly to the dyestuff and to its application.

NEW PRODUCTS

(Continued from page 498)

***Hydroxy Mildewproof 3-T**—(KALI)—a solvent mildewproofing solution containing phenyl-mecuric-acetate as fungicide. Particularly adapted for mildewproofing threads. (Specification J.Q.D. 190-F, P.Q.-D. 256-B).

* Trade-mark.

***Hydroxy Water Shield 4-A**—(KALI)—a concentrated emulsion of high melting waxes and aluminum salts. Water solutions used on duck fabrics (specifications J.Q.D. 226-C and J.Q.D. 231-C), etc., woolen fabrics and on hosiery.

* Trade-mark.

***Hydroxy Water-Shield P. J.**—(KALI)—a concentrated emulsion of high melting waxes and aluminum salts. Water solutions used on fabrics for Philadelphia and Jeffersonville Q. M. Depots (P.Q.D.-127, P.Q.D.-33-A, P.Q.D.-135, J.Q.D. 226-C, J.Q.D. 231-C), also on rayon (AXS-707), woolen fabrics, and hosiery.

* Trade-mark.

***Hydroxy Water-Shield P-115**—(KALI)—a solution of waxes in solvent for obtaining water-repellency on fabrics according to specification P.Q.D. 115-B.

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof No. 2**—(KALI)—a water-repellent and mildew-resistant product containing dihydroxy-dichlor-diphenyl-methane as fungicide. Used on yarns, thread and fabrics for Philadelphia and Jeffersonville Q. M. Depots.

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof 2 F-1**—(KALI)—a water-repellent and mildew-resistant product containing high concentration of dihydroxy-dichlor-diphenyl-methane as fungicide. Used as two-bath method in connection with Hydroxy Water-Shield and Mildewproof 2 F-2. (Specification J.Q.D. 190-F.)

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof 2 F-2** — (KALI) — concentrated aluminum salt solution, used in connection with Hydroxy Water-Shield and Mildewproof 2 F-1.

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof 3**—(KALI)—a water-repellent and mildew-resistant product containing phenylmercuric-acetate as fungicide.

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof 4-M** — (KALI) — a concentrated water-repellent and mildew-proofing emulsion, containing Puratized N 5-X as fungicide. Used on Army duck fabrics. (Specification J.Q.D. 226-C and 231-C, P.Q.D. 256-B.)

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof 4-S** — (KALI) — a concentrated water-repellent and mildew-proofing emulsion, containing Puratized N 5-X as fungicide. Particularly adapted for nettings (Specification P.Q.D. 260-A, P.Q.D. 379).

* Trade-mark.

***Hydroxy Water-Shield & Mildewproof P-115**—(KALI)—a solvent water-repellent and mildew-proofing product containing dihydroxy-dichlor-diphenyl-methane as fungicide.

* Trade-mark.

I

Intracols — (SYNTHETIC)—cation-active surface active substance; long chain fatty acid basic amide. It has good affinity for the textile fiber and is said to impart softening and lubricating properties to the fiber. It is suitable for cotton and rayon materials. It is soluble in water and is said to form a stable compound, stable to Glauber's salt, calcium, magnesium and sodium chlorides, and aluminum acetate.

Intrals — (SYNTHETIC)—non-ionic and neutral in character, containing no basic or acidic groups, no sulfonates, sulfates, inorganic or organic salts. Intrals are said to be highly active polar compounds, deriving their water dispersability from polymeric ether groups. It is stated that they have special application in wetting, dispersing and emulsifying work where electrolytes or organic salts are undesirable. They are active wetting agents in highly alkaline solutions.

Isothan IQ—(ONYX)—a cationic antiseptic serviceable for use in the purification of feathers. Product is water soluble and substantive to textile fabric.

J

Janusol — (SYNTHETIC) — cation active and anion active, amphoteric in character; contains both sulfonic groups and free amino groups. Suitable for suspending fine particles, paste, vat dyes, pigments and lakes. Said to be a good wetting agent in alkaline bleaches and hypochlorite peroxide high alkaline baths.

K

Kalray Wax No. 2—(KALI)—a blend of waxes of various melting points, vegetable and esterified waxes, miscible in water and used in the troughs on the coning machines for treating of rayon after it has been twisted for hosiery.

Kopan No. 47—(HART)—a new permanent cellulose finish for rayons—spuns, filaments and acetates. This product is said to produce a permanent finish with a soft, mellow hand and improve the abrasion resistance and wearing qualities of the fabric.

Kopan No. 60—(HART)—a new permanent cellulose finish for cotton fabrics. It is stated that it is used to impart permanent stiffness, increased strength and for shrinkage control. Pigments and fillers may be used in one bath with this product to obtain permanent effects.

"Kromfax"* Solvent — (CARBIDE and CARBON)—a non-volatile, hygroscopic, practically colorless liquid, neutral in reaction and completely soluble in water. It is said to be an excellent all-around solvent for basic, acid and vat dyestuffs used in textile printing and may be generally employed to replace all or part of the glycerin, acetin, diacetin or triacetin, in dissolving these colors.

* Trade-mark.

L

Lamepon A — (CHEMICAL)—a condensate of hydrolyzed protein and fatty acid radicals, which is said to combine to an unusual degree the following useful properties: detergency, lime stability, dispersion, emulsification, wetting, penetration, foaming, chemical stability, leveling, retarding, protective buffering and complete rinsability. For nearly all kinds of textile processing, the preparation of stable emulsions and as an auxiliary to textile soaps and commercial cleansing compounds.

Lamepon K — (MAYWOOD) — condensation products of protein and fatty acids furnish the essential characteristics of

this surface active agent. It is stated that, as a result of its pronounced dispersing and emulsifying action it finds application in the scouring, bleaching, dyeing and finishing of all fibers. Good absorbency and a soft, full hand are said to be recognized properties of the goods. Lamepon K is also used as a foundation material in the manufacture of compounded textile assistants and related materials.

Lanitol F — (ARKANSAS) — a new synthetic detergent that may be used in all scouring, boil-off and washing operations with excellent results. It is said to be active in neutral or alkaline solutions and to be highly resistant to hard water. It combines scouring, emulsifying and wetting actions and may be employed satisfactorily as a soap substitute or extender. Being neutral, it is used alone in the bath where a neutral scouring action is desired or in conjunction with alkalis where an alkaline boil-off is necessary.

Levelene—(A.A.P.)—said to be an excellent penetrant and leveling agent for direct, union and Celanese dyes as well as a stable, dispersing penetrant for use in rot proof and mildew proof processing. This specialty is said to serve well as a levelling agent on many vat dyes and is an excellent catalyst in the stripping of vat dyes.

LF-145 — (BURK-SCHIER) — a synthetic wetting agent marked by exceptionally low-foaming properties. Where it is desired to use a synthetic organic compound but excessive foaming would be objectionable, LF-145 finds ready application.

M

Magnaflake — (MAGNA) — Metal powders.

Mercerade CA—(ONYX)—a cationic auxiliary serviceable for use in mercerizing baths to facilitate mercerizing operations. Permits recovery of caustic from waste liquors.

Mildewtex—(ONYX)—a preparation that is said to simultaneously impart water repellency and moth proofness to textile fabrics. May be applied on pad, quetsch, box or laundry wheel.

Modinal* DN Paste (Pat.)—du PONT)—claimed to be a very efficient synthetic detergent and dyeing assistant. It is a fatty alcohol sulfate and is similar in general properties to other Modinal types. It is stated that this product dissolves readily, has excellent detergent properties, aids in producing fabrics with greater brightness and clarity of color in addition to imparting a pleasing hand.

* Registered Trade-mark.

Modinal DN Paste—(P & G)—a detergent, wetting-out, dyeing assistant, scouring and emulsifying agent. Its chemical nature is that of a long chain alcohol sulfate.

Mulsor — (SYNTHETIC)—synthetic organic compound of uniform composition miscible in all proportions with all petroleum oil fractions, said to be stable to heat and light, to be neutral, to contain no oleates, phenols or metallic elements. It is stated that it is colorless, odorless, and will not become rancid and is not affected by hardness of water, acidity or alkalinity. Stock oiled with Mulsor treated textile oils, is said to give good scourability and does not impair the strength of the fibers.

N

Negamines—(SYNTHETIC)—cation active, surface active substances having free basic amino groups and chemically are amino esters of long chain fatty acids. Completely soluble in water. It is claimed that they are suitable for finishing, softening, lubrication of fibers, dyeing with basic dyes and basic materials. They are dispersing and wetting agents said to be compatible with other cation active substances and provide effective softening on cotton, rayon and wool, durable to launderings.

Neutronyx 34 — (ONYX)—non-ionic surface active agent. Amber colored, oily liquid. Miscible with water. It is said to be stable in presence of electrolytes. Detergent for wool, cotton and rayon.

Neutronyx 228 — (ONYX)—non-ionic surface active agents. Amber colored, oily liquid. Miscible with water and most organic solvents. It is said to be stable in presence of electrolytes. Detergent and emulsifying agent.

No-Odorol 803-N—(CYANAMID) — a new finishing oil recommended by the manufacturer for fine cottons as well as for all types of synthetic fibers and mixtures.

Norane* — (WARWICK) — a durable water repellent finish being used on all types of cotton and rayon fabrics.

* Trade-mark.

O

Onyx B.T.C.—(ONYX)—a surface active cationic disinfectant, germicide and fungicide useful for application to all types of textile materials. Substantive to wool, cotton, rayon. It is said to show unusual resistance to electrolyte solutions. At present available only on high priority rating.

Oranap Powder—(WOLF)—a Sodium higher alkyl naphthalene sulfonate. It is a light powder soluble in water. Used as a wetting agent for neutral, acid and alkaline baths.

Oratol L-48—(WOLF)—a sulfonated Aliphatic Amide. It is a water soluble paste used as a penetrator, emulsifier, and dispersing agent for textile and leather compounds.

P

Pais-Flex*—(PAISLEY)—a series of synthetic substitutes for latex, grease-and-waterproof; for coatings of all kinds.

* Trade-mark.

Parapel NBN—(ALROSE)—a wax emulsion that produces stable baths with aluminum acetate or formate. Primarily intended for use on acetate fabrics where it reduces marking off. It is stated that it is also excellent for use wherever superior spray test or hydrostatic pressure test ratings are desired.

Penetrator 1276 — (COMMONWEALTH)—a penetrating and leveling agent made from a hydrocarbon sulfonate, recommended by the manufacturers for dyeing rayon and cotton.

Perma-Cide* — (REFINED) — compounds for imparting bacteriostatic, fungistatic and mildew-resistant finishes to textiles, paper and leather. Special Perma-Cides (A-5, AL-10, OS, E and E1) make it possible to apply these finishes from aqueous, hydrocarbon or other solvent solutions. They are said to be compatible with water repellents, cellulose solutions, paints, and other coating compounds. The water soluble Perma-Cides are said to make excellent preservatives and mold inhibitors for both carbohydrate and protein sizing solutions.

* Reg. U. S. Pat. Off.

Perma Fix*—(REFINED)—a compound which fixes direct colors on cottons and rayons and also acts as a softener. Applied in the last rinse, it is said to greatly reduce the bleeding and crocking of direct colors.

* Reg. U. S. Pat. Off.

Perma Wet*—(REFINED)—an alkyl sulfonate type of wetting agent said to be active at high and low temperatures. It is used for the wetting and dispersing of vat dyestuffs and makes a valuable addition to wool fulling baths.

* Reg. U. S. Pat. Off.

Polybond—(BURK-SCHIER)—a synthetic finish said to possess superior bonding properties and good durability. It is useful in setting the shrinkage in proofed goods.

Polysorb 150 — (BURK-SCHIER) — this product is said to combine primary and secondary wetting properties to a marked degree. It is claimed that it is well above the average in wetting speed and goods processed with Polysorb 150 are absorbent and easily re-wet. Polysorb is neutral in reaction and compatible with all of the customary finishing agents in use, including starches, gums, sulfonated products, cation softeners, resins, etc.

Propylene Glycol Borate (S 785)—(GLYCO)—a glycerine substitute with a high viscosity. Completely soluble in water. It is stated that it can be used in place of glycerine as a softener, lubricant, etc.

Protenol K — (CONTINENTAL)—a detergent and dye assistant—emulsifier and dispersing agent. For use in boil off dye bath or print wash, on synthetics or natural fibers. Extensively used on acetates.

Protex GEL W.(CIBA)—said to be a highly efficient protective colloidal agent with the related properties of dispersion, deflocculation, and emulsification. It is further said to be an excellent dye leveler and retarding agent.

Puratized Process* — (GALLOWHUR)—antiseptic agent used for the treating of textiles, textile finishes, rubber, leather, paper, paints and plastics in order that they may be rendered lastingly bacteriostatic and fungistatic—mildew and mold resistant. Depending upon the formula used (N5, N5-X, N5-D, LN PC, B-2) the Puratized Process may be introduced into materials by way of the aqueous phase and aqueous phase finishes, hydrocarbon solvents or emulsions, dispersions, and alkali soluble cellulose finishes. It is claimed that the lasting antiseptic finish that the Puratized Process formulas impart to materials and its convenience of application have made it particularly desirable for use in all the above-mentioned types of products.

* Trade-mark Reg. U. S. Pat. Off.

R

Radul S—(CIBA)—a non-cationic delustering agent for synthetic fibers, which can be used in conjunction with all types of finishing oils, gums, etc.

Repel-O-Tex* 115 B — (ONYX) — a wax type water repellent free from glue, gelatin, gums and the conventional stabilizing agents. It is stated that the product does not putrify or ferment and produces extremely potent effects on all classes of textile materials. Product is designed for use on pad, quetsch, or laundry wheel.

* Trade-mark.

Repel-O-Tex* QM 33 — (ONYX) — similar to Repel-O-Tex 115-B but contains ingredients to impart waxier affects to fabrics. Excellent exhaustion of proofing ingredients is said to be secured from box applications.

* Trade-mark.

Repel-O-Tex* SW 56—(ONYX)—an advanced solvent type of water repellent serviceable for application from dry cleaning and hydrocarbon solvents. May be applied as spray or dip. Compatible with many mildewproofing agents. Recommended by the manufacturer for use on raw cotton and its fabrics, in dry cleaning, etc.

* Trade-mark.

Repel-O-Tex* S 15—(ONYX)—an advanced solvent type of water repellent especially formulated for use on cotton webbing and similar materials. It is designed for use with solvent soluble mildew inhibitors and aids the retention of the latter during weathering and leaching.

* Trade-mark.

Resifin No. 2—(CIBA)—a urea formaldehyde resin in paste form for application to cellulosic fibers. It is said to produce a permanent finish and stabilize shrinkage.

Resigum* "N-t'T" — (MORNINGSTAR)—(Dry)—a complete filler for low count weaves (not a backfill). It is claimed that it: may be water soaked without dissolving; upon drying repossesses its original stiffness; increases break and reistance to dusting; yields complete coverage with translucency.

* Trade-mark.

Resilex*—(PAISLEY)—712-Q a synthetic resin concentrate (moisture-free) for warp sizing rayon and acetates.

* Trade-mark.

RHoplex* W-A5—(ROHM & HAAS)—an aqueous, solvent-free solution of a fully polymerized, hard acrylic resin. Can be diluted with water. Application is carried out by padding at room temperature and drying. No curing or after wash is necessary. In full strength it has been used to form a hard tip on webbings, tapes, ropes, etc., replacing metal.

* Trade-mark.

RHozyme* D-200—(ROHM & HAAS)—claimed to be a powerful enzyme primarily diastatic with secondary proteolytic activity which acts specifically on starch, and starch combinations. It is stated that it is odorless, colorless, and cannot dull whites or light shades. No after wash is necessary, effecting a conversion of the sizing starch to the finishing starch in one operation.

* Trade-mark.

S

Sarkoline P—(COMMONWEALTH)—a new detergent and scouring agent made from readily available raw materials.

SKC Powder — (ALROSE) — a controlled mixture of alkalies, etc., especially designed as an assistant in caustic and peroxide kier boils. It is said to reduce caustic consumption, eliminate stains, and stabilize peroxide boils.

Soluble Oil CQN—(BURK-SCHIER)—a lubricating and conditioning agent for yarns, said to provide maximum absorbency and uniform conditioning. It is stated that Soluble Oil CQN is emulsified with appreciably greater ease than the usual product of this type. It is readily soluble in cold tap water and may be applied from a cold or hot bath, either dilute or concentrated.

Solvenal L P X — (COMMONWEALTH)—an emulsifying, scouring and penetrating agent especially recommended by the manufacturer for use in the processing of hosiery and knit goods.

Sorbic Acid O—(ALROSE)—a substitute for acetic acid in dyeing acid or chrome colors on woolens. It is stated that it may be used, pound for pound, against 56% Acetic Acid. Contains no mineral acids but full development of chrome colors by after chroming is said to be attained more quickly than with Acetic Acid. It is claimed to be an ideal substitute for Tartar in mordanting wool for chrome mordant dyeing.

Stearonyx CA 10—(ONYX)—an advanced mildewproofing agent and fungicide particularly serviceable for use on jute fabrics and Osnaberg. It is said to show an excellent wetting action and penetrating potency.

Sulfanole* L—(WARWICK)—a synthetic detergent which is said to be practically unaffected by hard water or weak acids. It is being used for the scouring of cotton, rayon and woolen fabrics.

* Trade-mark.

Sulphoricinol P310—(BICK)—a new wetting out agent and penetrant, used successfully on all types of fabrics and machines. It is stated that materials wetted out with this product will not become heavy, but remain buoyant, consequently permitting easier dyeing and handling.

Synthogel* 9-E—(MORNINGSTAR)—a synthetic gelatin of interest to the throwster of rayon and combination yarns, replacing gelatin with full pebble control; readily desized in finishing crepe.

* Trade-mark.

Synthwax*—(PAISLEY)—a series of synthetic waxes with melting points from 125-230°F. with a wide variety of uses.

* Trade-mark.

T

Triton* 770 Clear—(ROHM & HAAS)—a synthetic detergent and penetrating agent said to be especially effective in neutral or alkaline solutions. It is further said to be outstanding for its sudsing properties good rinsibility, and its efficiency in hard water. Besides its wide use in the textile industry as a scouring agent it has proved highly useful in degreasing skins in the leather industry and in the formulation of household and industrial cleaning compounds.

* Trade-mark.

W

Wax Emulsion CM—(ALROSE)—a soft cotton finish which may be calendered to a high gloss for use on dress goods and broadcloth shirtings.

X

X-Flex* 80-V—(PAISLEY)—a water emulsifiable synthetic substitute for latex (moisture free).

* Trade-mark.

Xynocote M—(ONYX)—a fire resistant solvent resin coating composition. Designed to be used where durable fire resistant properties are a prerequisite.

Xynocote NY—(ONYX)—an aqueous resin emulsion recommended by the manu-

facturer for imparting a stiff full hand. The emulsion can be most advantageously applied to fabrics by back filling. Priorities required for present applications.

Xynocote VH—(ONYX)—a synthetic resin emulsion designed to produce a flexible "back coating" on textile fabrics. It is also useful in locking the pile of velvets, velveteens and similar materials to the back. Priorities are required for present applications.

Z

Zinc Borate-3167—(N. J. ZINC)—a specially developed zinc intermediary recommended by the manufacturers for use in fire-resistant compositions, especially where resistance to weather, water and mildew also are important factors.

Zirconium Acetate and Sodium Zirconium Acetate — (TITANIUM) — a compound used in water repellant treatment of cotton, rayon and other textiles by newly developed processes (report available) or in conjunction with wax emulsions to replace aluminum acetate. Water repellance and resistance to weathering, etc., is said to be very high.

Zirconium Carbonate—(TITANIUM) —a compound used in water repellent treatment of cotton, rayon and other textiles. Compound must be converted to acetate in dipping tank before use.

Zirconium Oxychloride — (TITANIUM)—a compound used in the wax emulsion type water repellant treatment of textile as aluminum acetate substitute. Field reports indicate improved water repellance and longer resistance to weathering, etc.

EQUIPMENT

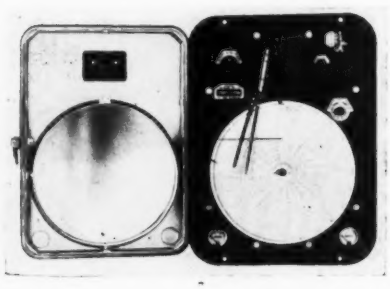
Air-Operated Controller — (BRISTOL—)a new air-operated automatic control instrument, known as Convertible Free-Vane Controller. The new instrument is made for automatically controlling temperature (up to 3600°F.) flow, liquid level, pressure, draft, humidity, pH value, and time program.

The Convertible Free-Vane Controller operates on the same basic Free-Vane principle as that used in previous models offered by the company. In the Convertible-Type Controller a number of design refinements have been incorporated, which simplify the instrument and make it more convenient to service. The new instrument is also designed so that the user can convert from one type of control system to another.

The Convertible Air-Operated Controller is offered in the following types: Monoset (On and Off), Ampliset (Throttling), Preset, Reset, and Magniset.

The adjustments for fitting the controller to the requirements of the process are located on a dial board above the chart.

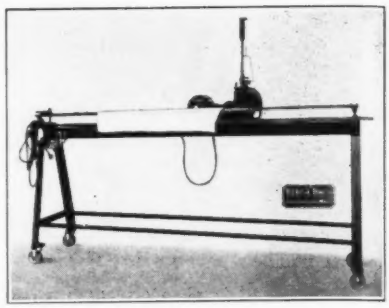
Convertible Free-Vane Controller.



Constant Cloth Speed Tuber—(VAN VLAANDEREN)—with this tuber, increased speed up to 200 yards a minute is said to be possible, under complete control and constant cloth speed. Tension can be adjusted easily and quickly by the operator, from tensionless to the maximum on the package. The let-off is so designed and placed that it can be easily and quickly loaded. Let-off and take-up are both on the operator's side of the machine, saving time and floor space. It is stated that measuring is accurate and dependable since tension between the let-off and measuring drum has been reduced to the minimum. Start, stop, let-off, take-up and measuring drum are synchronously controlled by operating one foot pedal. The measuring roll is non-corrosive, has a long wearing finish and is mounted on a movable carriage to facilitate selvage alignment. Other features of the machine include: Ball bearings are used throughout; Electrical equipment is all enclosed in dustproof, machine surfaced housing attached to the machine; Yardage meter is located close to the measuring drum for easy reading; Lubricated parts are all sealed permanently; Tube holder is non-slip and self-locking type with instant release.

"Coronation" Railway Sewing Machine—(Birch)—this machine is an adaption of the "Coronation" Chain Stitch Head to the Railway Mounting. This Head, which has a reciprocating hook around which the thread can not become wound, commences sewing at the edge of the fabric. The fabric does not have to be under the needle to prevent winding around the looper. The machine is said to be particularly desirable where a chain stitch machine is desired to sew heavy or closely woven fabrics or very loosely woven fabrics that have a tendency to pull through the needle plate of revolving looper machines.

The Railway Mounting is fitted with large rubber-tired swivel castors so that it may be moved easily and quietly. The machine may also be had with the bed or track suitable for mounting on the frames of processing machines. The travel of the Head is stopped automatically and the machine is adjustable to various widths of fabric and the fabric is held on both sides of the needle.



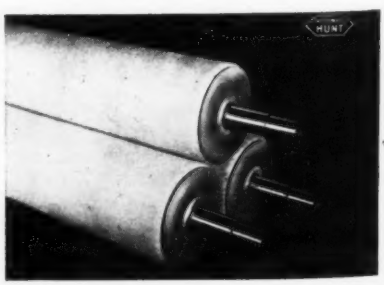
"Coronation" Railway Sewing Machine

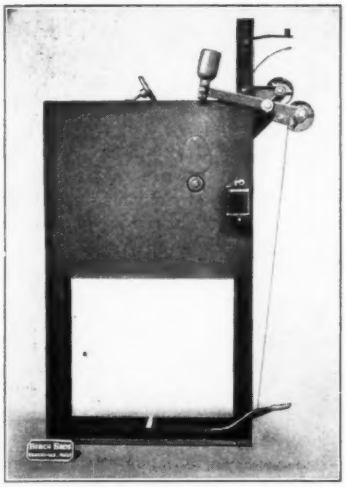
Cushion Surface Wood Rolls—(RODNEY HUNT)—in many industries wood rolls are in common use not only because of their low cost, but for some kinds of work the surface of wood has valuable physical characteristics that is not duplicated by any other material. For example, a pair of wood squeeze rolls produce a marked difference squeeze at the nip compared to rolls having surface of metal, rubber, or other materials.

In some cases, the type of work calls for a still different character of surface—one with more cushioning effect. Woven felt is one material that provides an ideal cushion. To use this material and avoid all seams or joints, Rodney Hunt felt coverings are woven in tubular form, not unlike cotton fire hose. Size of such tubular felt jackets is naturally determined by the size of the body on which they are to be mounted. Furthermore, thickness of the felt is determined by how much cushioning effect is desired.

These cushion jacket rolls of Shaf-tite construction are available in many sizes today. Illustration shows 6" diameter roll on which jackets are about ⅛" thick. To insure the jackets covering full length of face of roll, they are made extra long and come down over the ends of the roll, and in many cases metal end plates are provided as shown in the illustration.

Cushion Surface Wood Rolls.





Floor Type De-Tacking Machine

Floor Type De-Tacking Machine—BIRCH)—this machine sets on the floor midway between the Poteye or De-Twisting Machine (which is located over the cloth truck) and the Cloth Opener. The machine is fitted with a variable speed motor drive so that the pulling of the Tacking Thread may be synchronized with the travel of the cloth. Also to permit adjustments for various thicknesses of cloth which take more or less tacking thread.

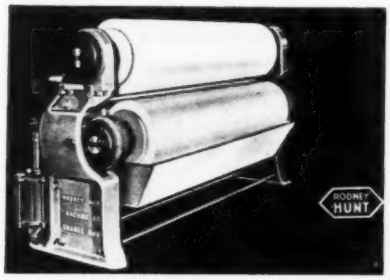
The speed adjustment is made by means of the hand wheel at the top of the machine. The Tacking Thread to be pulled is threaded through the tension device, then through a feeler arm and between the two rollers which pull the tacking and drop it into a basket or other receptacle placed on the floor. If the tacking thread should break, the feeler arm drops, tripping a limit switch which stops the machine quickly until the operator recovers the end of the thread.

The machine is made so that the threading of the Tacking Machine thread between the rolls is quick and simple, the foot pedal pulling the two rolls apart for this purpose.

Heavy Duty Padder-Mangle—(RODNEY HUNT)—a new Padder-Mangle which, it is stated, has several unique features not heretofore available in this type of machine. The new machine is an extra heavy duty pneumatically controlled unit which provides operating pressures from 0 to 30,000 pounds.

A unique feature of the machine is the arrangement of the rolls at an angle rather than having the top roll directly over the bottom roll. This feature, according to Rodney Hunt, insures a greater uniformity of padding and dyeing, eliminating the deeper shades on the selvage which is a frequent source of trouble on ordinary machines.

Another exclusive Rodney Hunt feature is applying the pneumatically controlled pressure to the bottom roll rather than the top. By making the bottom roll movable it allows this roll to drop out of contact with the fabric by gravity when not in operation and thus eliminates the need for continuous air pressure in order to keep the rolls out of contact.



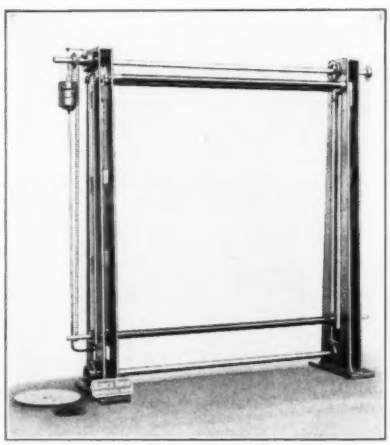
Heavy Duty Padder Mangle.

The photograph shows a typical tub arrangement with this unit, but any type of tub or arrangement of immersion rolls can be provided, according to the manufacturer. The tubs can also be designed for short or long baths and the units can be provided with the means for heating the processing liquor.

Individual Self-contained Compensating Gate—(BIRCH)—this machine is so constructed that it may be used either ahead of the machine to regulate the tension of the cloth or it may be used beween several machines to regulate the speed of one machine to the other. The frame is of heavy cast iron construction with all sliding or contacting points machine-finished. These frames are held together with two stay rods at the top and bottom to insure rigidity.

At the top of the machine are two rolls fitted with Ball or Oilless Bearings. These

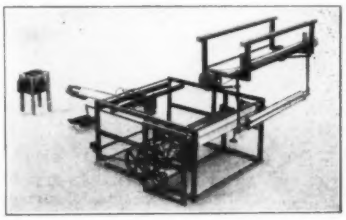
Individual Compensator Gate



rolls are made of brass or steel with a protective coating. The Dancer Roll is also made of the same material as above and is also mounted with oilless bearings. The vertical travel of this roll is controlled through sprockets and chain at each end and has a traveling distance of approximately four feet. The Dancer Roll may be arranged to accommodate the necessary sprockets, etc., for variable speed controls.

Knit Goods Splitting, Opening, Extracting, and Folding Range—(BIRCH)—this machine has now been operating for a year with, it is claimed, exceptionally good results and has proven a great labor-saving device. The operation of the Machine is as follows:

The cloth is first sewn together as it comes from the washers; it is then thrown over the rail at the truck and passed through the Cook's Patent De-Twisting Machine which removes the twist from the cloth as it travels toward the splitter table. On the end of this table is a revolving nose piece where the operator stands and guides the drop stitch to the knife by revolving the



Splitting Range

nose slightly to the right or left as the case may be. After the cloth has been split, it continues on to an opening device that spreads the cloth to a flat sheet just prior to its travel over the Patent Adjustable Jaw Vacuum Box where the excess water is extracted, it then continues on to the Draw Rolls which are rubber covered and arranged so that the cloth will pass under the bottom roll and then through the nip and up to the ceiling folder where it is folded into a truck.

The machine is arranged with a variable speed drive and is producing at an average of 20 pieces per hour.

Plastic Covered Rolls — (RODNEY HUNT—the illustration shows one of the new Rodney Hunt Plastic Covered Rolls of "Shaf-tite" construction. This particular roll is about 5½" diameter with the No. 4203 Plastic covering, and is said to offer a number of real practical advantages.

Plastic Covered Roll.

Basically, this is an all metal roll. The surface of the roll body has the plastic covering which provides a hard smooth glass-like surface, which the manufacturer claims is unaffected by most acids and alkalies. It is easily cleaned, and rates a high wear resistance.

This Roll is said to be ideal for such use as guide rolls, idlers, (also conveyor rolls) where exposed steel and iron is objectionable, but where hard smooth surface is desired.

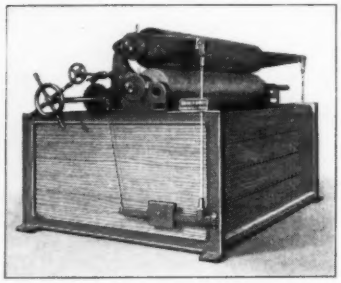
Sample Dryer —(RODNEY HUNT) —a patented unit to dry sample swatches at what, it is claimed, are phenomenally high speeds.

The conventional way to dry samples in a textile mill is over a steam pipe or by a hair dryer. The dyer cuts a sample 4-inch square, dries it for 10 to 20 minutes, and then waves it around in the air to condition it to room temperature and humidity before matching. Not only does this take valuable production time but it also gives the cloth in the dye kettle a chance to change shade, lessening the accuracy of the match. The new Rodney Hunt unit, known as the "Whirlwind" Sample Dryer, does both the drying and conditioning operations in from one to two minutes, depending upon the material.

The process is basically one of rotating the samples at high speeds, first in a dryer cabinet and then in the room at normal temperature and humidity. The samples are placed on wire screens on a disc or rotor which is attached to the inside of the door of an insulated cabinet. The door is closed, the motor turned on, and the samples rotate inside the cabinet at great speed building up an effective air velocity of approximately 6,000 feet per minute. This forces air under great pressure directly through the cloth, thus giving phenomenal drying speed. After the sample is dried, the door of the cabinet is opened and the sample continues to rotate at room temperature and humidity until conditioned properly.

The entire operation takes less time than the description of it. Worsted suiting can be dried and conditioned in less than 1½ minutes, according to Rodney Hunt. Thirty-four ounce Army Meltons take about 3½ minutes to dry and condition, and lighter fabrics in proportion.

Squeeze Roll Bearings — (BIRCH) — these are of new weight and lever type equipped with roller bearings for medium pressure.



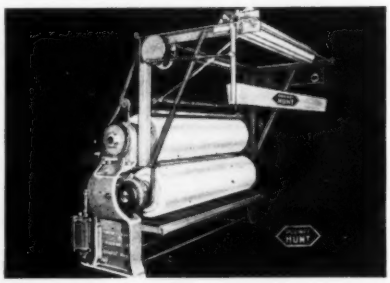
Showing Squeeze Roll Bearings

Squeeze Roll Extractor—(RODNEY HUNT—a new extractor for textile mills which, it is claimed, is the heaviest duty unit ever made. It is designed to extract moisture from open width knitted, woven, or piled fabrics continuously at high speeds. This type of extraction, according to Rodney Hunt, requires much less power and is simpler in operation than any of the other methods, such as rotary or vacuum type extraction. When this unit is used in range operation between wet and dry processes it requires no additional labor.

An unusual feature developed by Rodney Hunt is the movable bottom roll. In previous extractors the top roll has been movable, making it necessary to maintain air pressure at all times in order to keep the rolls out of contact as well as to produce the necessary pressure when in operation. By designing this new extractor with the bottom roll movable, Rodney Hunt now makes it possible for the rolls to stay out of contact by gravity. This avoids danger of leakage in the cylinder with resulting roll contact during non-operation periods.

Another special feature of this new extractor is the arrangement of the rolls themselves. Ordinarily, one roll is placed directly over the other, but Rodney Hunt textile engineers discovered that by "cocking" the rolls at an angle so that the cloth passes through on an incline they were able to eliminate an important extraction problem of "wet selvage". They found this condition was caused by the liquid remaining between the rolls in contact with the selvage at each end. But when the rolls were cocked and the cloth went through on an incline the liquid was forced back into the tub and the problem was solved.

Squeeze Roll Extractor.



The new Rodney Hunt Squeeze Roll Extractor controls the roll pressure by compressed air piped to the middle of the machine and distributed to both sides, automatically insuring an equalized pressure. A hand-controlled operating valve raises and lowers the bottom roll. The unit is regularly equipped to attach to the textile mill's compressed air supply but an automatic motor compressor can be furnished at small additional cost.

The rolls are of heavy cast iron covered with rubber of the required density.

The manufacturer claims that such a unit involves the absolute minimum of parts and that its maintenance cost is negligible.

The photo shows the new Rodney Hunt Squeeze Extractor with folder attachment.

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Russian War Relief
United China Relief
United Czechoslovak Relief
United Yugoslav Relief Fund
Refugee Relief Trustees
United States Committee for the Care of European Children

BOOK REVIEWS

The Chemical Front, by Williams Haynes. 264 pages, with copious index. Alfred A. Knopf. $3.

Mr. Haynes has produced a really splendid brief though comprehensive account of the accomplishments of this master key American industry. The extent of the coverage is indicated by the jacket of the volume which mentions the following subjects: Explosives, Poison Gas, Blood Plasma, Plastics, Light Metals, Smokescreens, Sulfa Drugs, Atabrine, Plywood, Synthetic Fibers, Incendiaries, Serums and Vaccines, Synthetic Rubber, High Octane Gasoline.

While this imposing list might seem to indicate something in the text book order, Mr. Haynes' treatment of the subject follows anything but text book style. It is a thrilling narrative of achievement written in non-technical language that will appeal strongly to the layman who knows little or nothing of chemistry as a science. An example of the approach is shown by the opening paragraph of the section devoted to blood plasma:

"He was no ordinary man, that marine, and the moment he stepped into the Red Cross Headquarters at New London, Connecticut, I spotted him for a victim. His double row of ribbons, the service stripes on his arm, the sergeant's chevrons proclaimed a soldier of parts. He carried these emblems of his profession lightly yet with an air of true distinction, and among that conspicuously well-turned-out corps the angle of his cap and the set of his belt were swankily correct."

While there may be little that is new to one who is well abreast of modern chemical developments among the facts presented in this volume, there are, nevertheless, many new slants in the inter-relationship of these facts which may well cause a new line of thought to even the most experienced of readers.

For example, it had never occurred to this reviewer to consider the difficulties facing a military staff whose last practical application of theory dated back 20 years in putting into wartime operations the new weapons of offense and defense with which the rapid advancement of science has provided them. "It is," according to Mr. Haynes, "as if a group of young physicians, fresh from medical school, were installed in an ivory tower, supplied with all the medical journals and books, given samples of the latest drugs, furnished with all the new instruments and improved apparatus, but kept for 20 years isolated from patients and clinics. Then suddenly they are put in charge of a great thousand-bed hospital in a city that has suffered an earthquake and in which a widespread fire is raging. To complete the analogy, the hospital would be manned by interns, nurses, and orderlies of whom only every fourth one is trained and competent, the other three quite inexperienced. As the stream of maimed and burned poured into the emergency rooms, we can be sure those doctors, for all their years of theoretical studies, would fall back upon the tested practices of their own first-owned experience 20 years before."

Mr. Haynes was for 20 years publisher of Drug & Chemical Markets and its successor, Chemical Industries. During the course of this active editorial lifetime he had occasion to know intimately practically all of the leading figures in American chemical industry. This acquaintanceship has stood him in good stead in the preparation of the present work—the volume is replete with intimate touches which only close association with the inner circle among the chemically great could have made possible.

All in all, the volume is well worth reading by everyone who has the slightest interest in the development of American industry and should serve as an excellent gift for those whose activities center around the manufacture of chemical products to present to non-technical friends whom they would like to have appreciate the dignity of their calling.

There are a number of excellent full page illustrations, several of them four color reproductions of very competent paintings, which add greatly to the volume's attractiveness.—A. P. H.

Elastic and Creep Properties of Filamentous Materials and Other High Polymers, by Herbert Leaderman, Sc. D. The Textile Foundation, National Bureau of Standards, Washington 25, D. C. Price $2.50 per copy, postpaid.

During the past few years there have been many remarkable technical developments in the field of high polymers. These developments have consisted in the production of new materials; in the modification of existing materials; and in the finding of new applications for existing materials. The important role played by synthetic high polymeric materials in the war effort and elsewhere is due in a large measure to their valuable mechanical and electrical properties. In an effort to understand better the nature of these properties, and how they are related to the chemical constitution of the material, much work has been done in the past decade on the physics of high polymers.

The present work is concerned with a study of a phenomenon-delayed elasticity—which is observed in most high polymers, as well as in other materials. The second part of the book gives an account of experiments that have been carried out by the author at the Massachusetts Institute of Technology, under the auspices of the Textile Foundation, on the creep and creep recovery behavior of rayon, nylon, and silk filaments. The experimental results are interpreted in terms of the structure of these materials, and conclusions are drawn concerning the mechanism of elastic and plastic deformation of textile filaments.

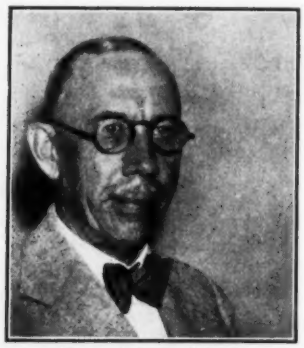
The first part of the book deals with similar work that has been carried out with other high polymers, and contains a critical discussion of relevant theories and of previous experimental work on delayed elastic behavior in other materials, such as glass. This book, in presenting some of the current concepts concerning the structure and mechanical behavior of filamentous materials, should be of value to the textile industry. For the same reason the book should be in the hands of all those who are concerned with the manufacture and processing of plastics and rubber-like materials.

TRADE NOTES • NEW PRODUCTS

OBITUARY

B. ANDERSON STIGEN

B. ANDERSON STIGEN, manager of the Charlotte branch of the General Dyestuff Corporation of New York, N. Y., died of a heart attack at his office on Tuesday, November 2, 1943. His age was seventy-one.



B. Anderson Stigen

Born and educated in Sweden, he went to the Dyeing School in Chemnitz in 1893. Upon graduation in 1897 he became a colorist for Leopold Cassella & Co., and was active in the introduction of their Immedial Blues. After spending two years in Great Britain he was engaged by W. J. Matheson & Co., New York, N. Y., in 1903 as a technician in the application of dyestuffs.

In 1917 he resigned to take a position in the woolen mill owned by his family in Sweden but in 1920 he returned to become associated with the National Aniline & Chemical Co., as Technician Service Manager. Early in 1926 he retired but later in the year, he returned from Sweden to become Manager of the Charlotte branch of the General Dyestuff Corporation. Under his able leadership the business expanded with the rapid growth of the textile industry in the South. In 1930 this branch moved into a new building with greatly increased facilities, but in 1940 this was outgrown and a spacious structure equipped with all the most up to date facilities for servicing the textile trade was erected under Mr. Stigen's leadership on the outskirts of Charlotte, N. C.

He leaves a daughter employed in the United States Embassy at Stockholm and a sister living in Sweden.

• DYESTUFFS

Contents of the September, 1943, issue of DYESTUFFS, publication of the National Aniline Division, Allied Chemical & Dye Corp., are described by the following titles: Substitutes for Sole Leather; Felt Hats; Painting the Ice; How to Extend the Life of Dyehouse Equipment; Madder —Ancient and Medieval; Shade Matching in Dyeing and Textile Printing. Copies of the publication are available upon request to National at 40 Rector Street, New York.

• JOINS H. K. PORTER

Victor P. Shaffer has been named engineer in charge of design for the Process Division of H. K. Porter Company, Inc., Pittsburgh, Pa. He will also direct an expanded program of development and research being launched by Porter.

A graduate of University of Colorado, Mr. Shaffer has been associated for the past 10 years with design, development and plant layout work for Calco Chemical Division of American Cyanamid Co. He is a member of the American Institute of Chemical Engineers.

• BIRCH BROS. CIRCULARS

Birch Bros., Inc., 32 Kent Street, Somerville, Mass., have available circulars on the following products Patent Reinforced Adjustable Vacuum Extracting Box, Simplified Power Perch, Single Roller Ball Bearing Scutcher, "Coronation" Chain Stitch Railway Sewing Machine, "Excel" Portable & Chain Stitch Foot Power Sewing Machine, Four Burner Horizontal Singeing Machine. Copies are available upon request.

• WHITE STAR FOR MATHIESON

In recognition of its continued contributions to the war effort, the Niagara Falls plant of the Mathieson Alkali Works, Inc., has been authorized to add a white star to its "E" flag.

The flag itself, which symbolizes the Army-Navy Production Award for high efficiency in the production of war materials, was presented to Mathieson last February. The white star, signifying that this efficiency has been continuously maintained during the succeeding six-month period, has just been awarded by the War Department.

Mathieson produces a variety of vital war materials, including chlorine, ammonia, caustic soda, soda ash, sodium chlorite, sodium methylate, solid and liquid carbon dioxide, and calcium hypochlorite. Most of these chemicals are essential in the production of such products as explosives, synthetic rubber, aviation gasoline, plastics, medical and sanitation supplies, while some are used on the fighting fronts for protecting the health of our armed forces.

• HOOKER APPOINTMENTS

The Hooker Electrochemical Company at Niagara Falls, New York, announces the following promotions and new appointments in its Sales Department:

Robert E. Wilkin, Eastern Sales Manager; Lauren B. Hitchcock, Manager of Sales Development; S. I. Anderson, Assistant Eastern Sales Manager; S. F. Maclaren, Assistant Eastern Sales Manager; G. F. Reale, Special Sales Supervisor; Wm. F. George, New York District Sales Supervisor; Wm. H. Monsson, Midwestern Sales Supervisor; George J. Bruyn, Office Manager, Niagara Sales Department.

Robert E. Wilkin, appointed Eastern Sales Manager with headquarters at Niagara Falls, New York, has been associated with the company since 1936 as Assistant Sales Manager for Organic Products. After receiving degrees in chemistry from Dennison University and the University of Iowa, he taught chemistry at Kansas State Agricultural College. He then joined the research staff of the Standard Oil Company of Indiana at Whiting, Indiana. After five years in the research laboratory, he was transferred to the Technical Division of the Sales Department in Chicago, and was manager of that division when he left to join the Hooker Electrochemical Company. Mr. Wilkin is a member of Lambda Chi Alpha, Alpha Chi Sigma and Sigma Xi fraternities and the Chemists' Club of New York.

Dr. Lauren B. Hitchcock, appointed Manager of Sales Development with headquarters at Niagara Falls, New York, has been associated with the company since 1935 in the capacity of Consulting General Engineer. For the first three years of this period he was in the Technical Service Department and for the past five years has been in the Research and Development Department. After receiv-

ing degrees in Chemical Engineering from the Massachusetts Institute of Technology, he served in various technical capacities in the United States Regular Army for seven years, resigning in 1928 to take charge of Chemical Engineering instruction at the University of Virginia. He has published numerous papers on technical and industrial subjects and has been active in the American Institute of Chemical Engineers and American Chemical Society. He is a member of Alpha Chi Sigma, Sigma Xi, Chemists' Club of New York and Cosmos Club of Washington, D. C.

Samuel I. Anderson, appointed Assistant Eastern Sales Manager with headquarters at Niagara Falls, New York, has been associated with the company since 1933. Formerly Midwestern Sales Representative, he has more recently been Regional Sales Supervisor with headquarters at Niagara Falls.

Stanley F. Maclaren, appointed Assistant Eastern Sales Manager with headquarters at Niagara Falls, New York, first joined the Research staff of the company in 1929. From 1931 to 1934 he was Vice President of Snyder Maclaren Processes, Inc., returning to Hooker in 1934. He was in the Technical Service Sales organization for several years, and recently has been Regional Sales Supervisor.

G. F. Reale, appointed Special Sales Supervisor, will make his headquarters at the company's New York office. He joined the Hooker Electrochemical Company in 1919 as a salesman. In 1936 he was appointed Assistant to the Sales Manager, which position he occupied until March, 1940, when he was appointed Assistant Sales Manager in charge of Heavy Chemicals.

William F. George, appointed New York District Sales Supervisor, will continue in charge of the New York Office of the company, located at 60 East 42nd Street, New York City. Mr. George was at one time connected with Hooker in the Niagara Falls plant and later in the New York sales office. He left the company in 1919 to organize the firm of W. F. George Chemicals, Inc., which business he conducted until 1928. He then went into the publishing business with "Chemical Industries" with which he was associated until rejoining the Hooker staff in May, 1942.

William H. Monsson, appointed Midwestern Sales Supervisor, has been a member of the sales organization since 1935. Because he has been located in the midwest for the past twenty years, he is particularly well acquainted in the pulp and paper industry of that region.

George J. Bruyn, appointed Office Manager of the Niagara Sales Department, has been associated with the company since 1924. For a number of years he served in the Accounting Department, then in the Traffic Department, and for the past four years has been Assistant to the Sales Manager.

• APPOINTED RESEARCH ADMINISTRATOR

Dr. Irving Hochstadter has just been appointed as Research Administrator to Gallowhur & Co., manufacturers of Skol, Skat, the newly developed Puratized process for treating textiles, textile finishes, leather, paint, paper, plastics and rubber to inhibit the growth of mildew-forming micro-organisms, a de-fogging device, and materials and other strategic chemicals designed to meet vital war requirements. Formerly, Dr. Hochstadter was President and Technical Director of the Hochstadter Laboratories, Inc., and of Still & Van Siclen, Inc.

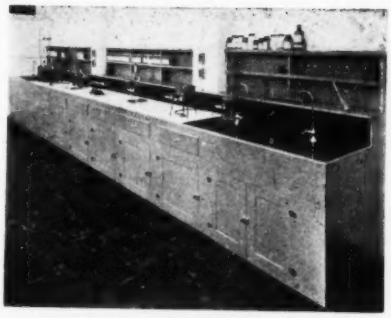
Dr. Irving Hochstadter

Dr. Hochstadter has been consultant and technical advisor to the glue and gelatine industry, and has done consultant work for the soap and detergent industry.

In addition, he has assisted in the development of many varied processes. One of these concerned the desiccated egg industry in China and this country, another the removal of excess sulfur dioxide in the bleaching of food products. Dr. Hochstadter has also developed products and processes used in connection with tungsten and molybdenum salts for producing lakes of various dyestuffs, as well as those involving tars and asphalts in the manufacture of coal briquettes.

• AMALGAMATED LABORATORY

Shown in the photograph is a portion of the research laboratory of the Amalgamated Chemical Corp., Rorer and Ontario Sts., Philadelphia 34, Pa. The table is constructed of the new Herculite Tempered Pressed Glass, manufactured by the Pittsburgh Plate Glass Co. The table is black and white and the sinks are of black Herculite glass. This product is said to be much stronger than glass and can stand the blow of a hammer without fracture.



Portion of Amalgamated Research Laboratory.

The Amalgamated company states that the new material is a decided improvement over the usual materials used for laboratory tables. At no time does it spot or mar and will stand a thermal shock of 300 deg. which prevents it from breaking even if there is a fire on the surface of the glass.

• TEXTRON WAR PRODUCTS MUSEUM

The opening ceremonies of the Textron War Products Museum were held on Thursday, October 7th, at four oclock, in the Textron offices, which ocupy the 42nd floor of the Empire State Building, 350 Fifth Avenue.

The exhibit is now open daily to the public from 10 a. m. to 5:45 p. m. The purchase, at the Museum, of one dollar's worth of War Savings Stamps from a representative of the A. W. V. S. will be required.

The Museum, a dramatic presentation of Textiles at War, features authentic war scenes created by Louis Paul Jonas, in cooperation with the War Department in order to assure authenticity. They are executed in the same technique which Mr. Jonas used recently in the much heralded exhibits at the Museum of Natural History.

These war exhibits include: "Paratroop Attack in Tunisia," "In the South Pacific" and "Mountain Infantry in Alaska." Additional exhibits will be added from time to time.

Another unque attraction of the exhibit is a display of: Jungle Hammocks, Camouflaged Mountain Tents, Human Escape Parachutes, Camouflage Troop Chutes, Fragmentation Bomb Chutes, Cargo Chutes, Glider Tow Ropes, Nylon shoelaces for Jungle Boots, and Flightex Airplane Cloth.

Expert riggers and packers are also to be present to demonstrate the packing of parachutes for action.

Twenty-four oustanding photographic murals of "Textiles at War Through the Ages," executed by Drix Duryea in cooperation with M. D. C. Crawford, portray the history of textiles at war, beginning with 7000 B. C. Starting with textiles

found in the Swiss Lake Villages and used during the first invasion of Europe, these murals carry on through the ages to the Textron textiles of the present war.

Of particular interest to air-minded Americans will be murals by Paul Robertson which show, in full color, many famous planes, from early 1920 models to the latest fighter plane. These cover the entire walls and ceiling of one of the rooms. The walls of another room are decorated with portraits of Textron's New England plants. These murals were executed by Leslie Powell. The decoration and layout of the Textron Offices were directed by W. & J. Sloane.

The purpose of this War Products Museum is to help bring home to the public, in visual and dramatic form, some conception of actual military engagements and the quantities and varieties of textile equipment necessary to support our forces. It is expected that the exhibit will eventually form the nucleus of a larger, permanent national exhibition. It may also be moved to some other section of the country for use by the Treasury Department in future War Bond activities.

Currently, chemists and technicians of the company are carrying on extensive Textronic Research for the purposes of developing new uses for synthetics during the war and for general post-war production of consumer products.

• JOINS ALCO

Alco Oil & Chemical Corporation, Philadelphia, Pennsylvania, manufacturers of specialty products for the textile and related industries, announce the appointment of George C. Graham, Jr., as chemist in charge of research and development. Mr. Graham has been associated with Rohm and Haas Co., and the Clearwater Manufacturing Co., for a number of years.

George C. Graham, Jr.

• ONYX FORUM

Shown below is a photograph taken at the meeting of the Onyx Forum on October 26th (see REPORTER, November 8th issue). Pictured are, left to right: Victor Berman, Onyx, Commander W. F. Prien, Brooklyn Naval Clothing Depot, W. H. Stuart, Onyx, Lt. Col. Frank M. Steadman, Philadelphia Quartermaster Depot, and Richard von Osen, Onyx.

• CLASSIFIED •

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: Hosiery Dyer. 17 years' experience covering all types of dyes and a wide variety of fabrics. Draft exempt. Write Box No. 474, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

WANTED: To contact a man with ability and experience necessary to supervise the operation of a rayon piece dyeing and finishing plant on spuns and filaments with boxes and jiggs. Write full history of experience to Box No. 484, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

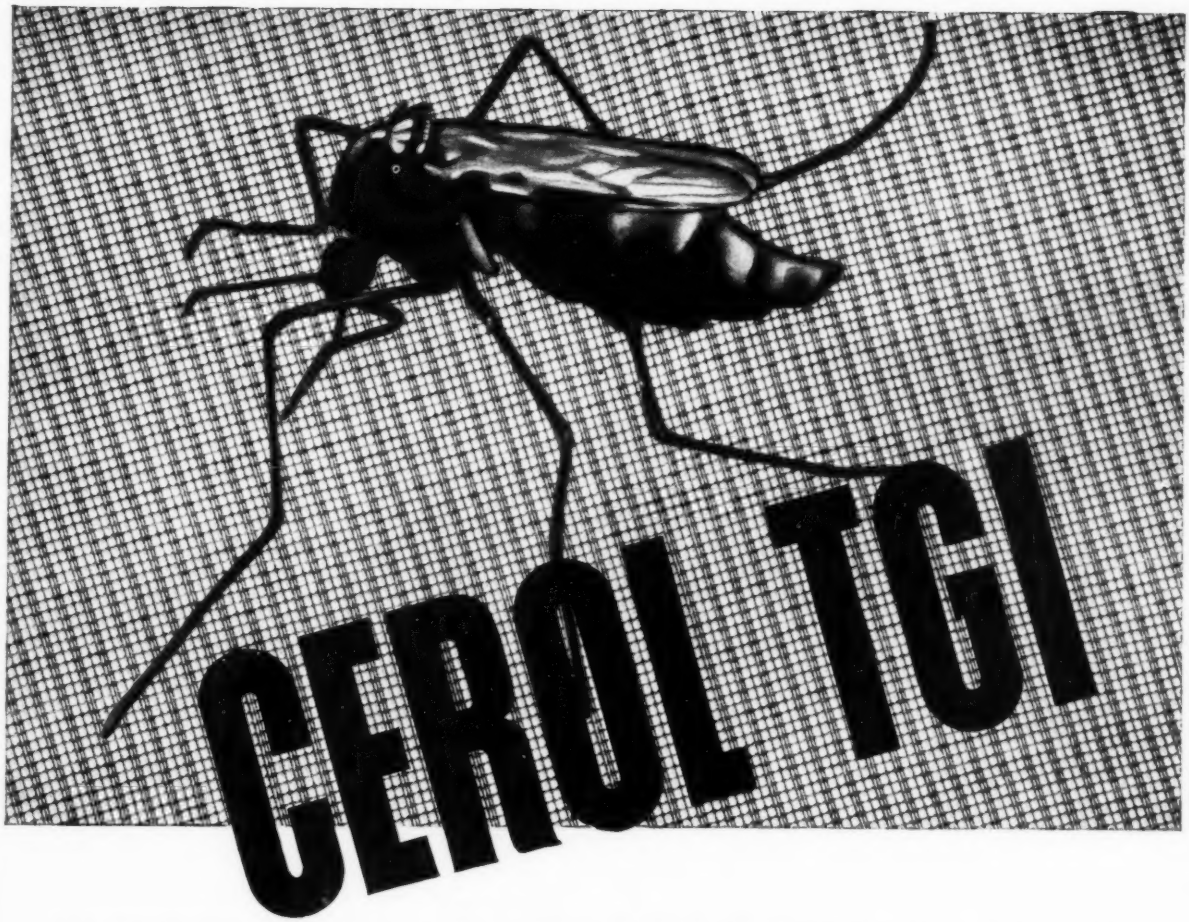
EXCELLENT OPPORTUNITY FOR TEXTILE GRADUATE: Large chemical company requires recent textile school graduate having a good background in chemistry for textile laboratory development work. Prefer one who has had finishing plant experience prior to, or since graduation. The work involved is essential, permanent, and offers an excellent post-war future. Salary commensurate with qualifications, experience and ability. Write Box No. 486, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: High class salesman with practical cotton dyehouse experience and business background, for established manufacturer of pressure dyeing machinery. Excellent opportunity and future for right man. Write full history of experience, age, nationality and salary to Box No. 487, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

WANTED: Dyer for package and skein dyeing on plain vat and direct colors. Must know formulas and procedure. Permanent position. Good Opportunity. Write giving full particulars. Box No. 488, American Dyes uff Reporter, 440 Fourth Ave., New York, 16, N. Y.

WANTED: Textile chemist by leading manufacturer for technical supervisory work in cotton processing. An excellent opportunity for an intelligent, alert man, preferably with 3 to 6 years industrial experience. Send complete qualifications including expected salary to Box No. 489, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

POSITION WANTED: Man with 7 years diversified technical background in textile field, A.B. in chemistry. Desires responsible position in 100% war work with reliable progressive company offering post-war future. Age 29, 3A, now employed. Write Box No. 490, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.



WATERPROOFING AND MILDEWPROOFING OF COTTON GOODS COMBINED IN ONE SIMPLE OPERATION . . .

At Last! — A Stable Emulsion. Now Sandoz presents a new member of the well-known CEROL family, a combined waterproofing and mildewproofing agent distinguished by extreme stability. CEROL TGI ends the danger of time lost in re-processing. By combining two operations in one, CEROL TGI greatly speeds up production.

Meets Government Specifications. CEROL TGI has established high standards in spray and mildew-resistance tests. Non-toxic, and therefore suitable for garments in contact with the skin, CEROL TGI is being put to immediate use for water-and-mildewproofing **mosquito netting** used in the tropics.

Saves Time and Manpower. Applicable to any cotton goods, CEROL TGI is easy to use with your normal cotton finishing equipment, such as padder, quetch or jig. Regular cans or frames are suitable for drying; no baking or curing is required. As well as saving production time, CEROL TGI, successfully used by relatively unskilled personnel, helps solve your manpower problem. Write for full details, naming your application.

SANDOZ CHEMICAL WORKS, INC.

61 Van Dam Street, New York, N. Y.

Sandoz thinks ahead with textiles

SANDOZ

Boston, Mass. Charlotte, N. C. Paterson, N. J. Philadelphia, Pa. Providence, R. I. Chicago, Ill. Los Angeles, Calif.

MORNINGSTAR, NICOL, INC.

Established 1851

PAISLEY PRODUCTS, INC.
630 West 51st Street
New York 19, N. Y.

PAISLEY PRODUCTS, INC.
1770 Canalport Avenue
Chicago 16, Illinois

STARCHES-DEXTRINES-GUMS-SYNTHETIC RESINS-BOX & TUBE GLUES

For the SPINNER and THROWSTER

Standard Pebble Control

Synthogel 9-E Rayon and Acetate Combinations 3* or 6* Oil
Synthogel 22-B (One Pint Chem 88-T = 15 lbs. Oil) Chemical 88-T
Penetra-Set "C" Extra for Bemberg insures uniform twist.

"SWEATLESS POWDER" for twisting-in and Knotting prevents soiled yarns

Penetra-Set "TXA" for Cotton Thread Twisting and Algae Preventive.
Penetra-Set "WW" for Worsted Yarn Conditioning.
No-Stain "XNX" Twister-Ring Grease prevents black knots or stains.

For the WEAVER

We Specialize in Concentrates . . . . . The Consumer Adds the Water . . . . . .

Synthogel	8	Acetate Warp Size . . . . . (Dry)	Paisley 4* Oil
Synthogel	8-A	Rayon Warp Size . . . . . (Dry)	Paisley M O 15
Synthogel	20-A	All filament Warp Size (Dry)	Self-Lubricating
Ray-Lub-Ize		All filament Warp Size, especially for Bemberg yarn.	
Resilex	712-Q	All filament Warp Size Synthetic Self-Lubricating	

Starch	Cotton Warp Slashing	Paisley Addasize
Starch	Slashing Spun Rayons & Mixtures	MNT Concentrate
J T G Gum Starch	Dressing Worsted Warps	Paisley Softa-Lube

"SHUTTLE GLUE" For Furring Shuttles. Ready-to-Use and Used Cold.

For the DYER and FINISHER

A.P.C. Mildew Preventive & Germicidal Cleanser Reduces Loss and Waste.

Dy-Pyne	Synthetic Pine Oils	Kier-Pyne No. 350
Nox-Fome	No. 1 & No. 630 for Defoaming	
Penetra-Set "D"	Detergent with High Emulsifying Power	
Penetra-Set "R"	Dyeing & Finishing Leveller and Yarn Conditioner	

"LIQUI-WASH" Removes Grease from Workers' Hands. No Skin Irritation.

SPECIALTIES

Resilex	Synthetic Penetrants with a Wide Variety of Uses.
Synthwax	Synthetic Waxes from 125° to 230°F. melting points.
Pais-Flex	Synthetic Latex Substitute—Grease-and-Water-Proof.
X-Flex 80-V	Synthetic Latex Substitute—Water Emulsifiable.
Steel-Set	Cement for repairs in the Machine Shop.
"RESILEX" 712-Q	The 99.99% Concentrate for Rayon and Acetate Warp Sizing. It is used cold, dries rapidly under low pressure, solving the moisture control problem while yielding extremely smooth film. It is YOUR FUTURE SIZING MEDIUM.

Note to Military Contractors

APPROVED COMPOUNDS FOR

MILDEW-PROOFING

MILDEW-PROOF TYPE 2 (Cuprammonium)*

MILDEW-PROOF TYPE 3 (Copper Ammonium Fluoride)*

Two thoroughly dependable compounds for mildew-proofing; tested and proved by finishers of military fabrics. These products are approved for government work and widely used in treating U. S. service burlap and osnaburg.

MILDEW-PROOF TYPE 2 and TYPE 3 avoid solvent difficulties and are applicable to all vegetable fabrics (cotton, linen, jute, paper, sisal, hemp). Suited for mold, mildew and rot resistance under every climatic condition. Samples and further information upon request.

*These two products, designated as Types 2 and 3 in a recent release by U. S. Army, meet all government specifications.

WOLF BRAND PRODUCTS

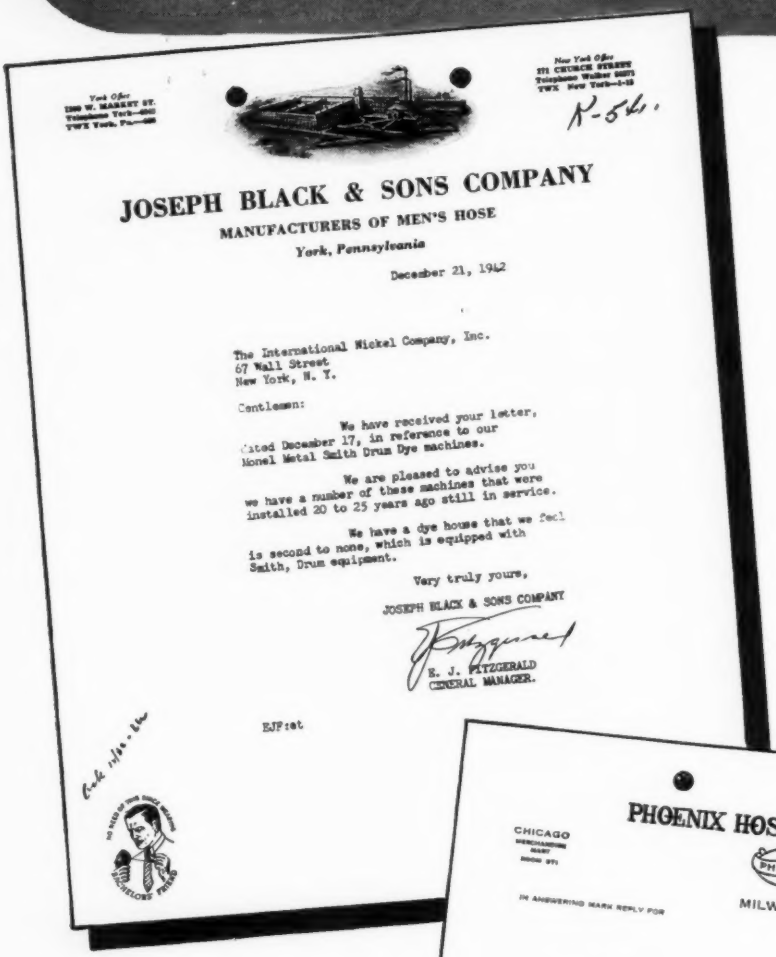
JACQUES WOLF & CO.

Chemicals PASSAIC, N. J.

WAREHOUSES: Providence, R. I., Philadelphia, Pa., Utica, N. Y., Chicago, Ill., Greenville, S. C., Chattanooga, Tenn., Knoxville, Tenn., Charlotte, N. C., Milwaukee, Wisc., Columbus, Ga.

Monel equipment spans two war periods

...serves in World War I and World War II



JOSEPH BLACK & SONS COMPANY

MANUFACTURERS OF MEN'S HOSE

York, Pennsylvania

December 21, 1942

The International Nickel Company, Inc.
67 Wall Street
New York, N. Y.

Gentlemen:

We have received your letter, dated December 17, in reference to our Monel Metal Smith Drum Dye machines.

We are pleased to advise you we have a number of these machines that were installed 20 to 25 years ago still in service.

We have a dye house that we feel is second to none, which is equipped with Smith, Drum equipment.

Very truly yours,

JOSEPH BLACK & SONS COMPANY

E. J. FITZGERALD
GENERAL MANAGER.

EJF:et

PHOENIX HOSIERY COMPANY

CHICAGO

PHOENIX

MILWAUKEE

NEW YORK

SAN FRANCISCO

Dec 22 1942

RECEIVED
DEC 24 1942

Mr C J Bianowicz
The International Nickel Co, Inc
67 Wall St
New York City

Dear Mr Bianowicz:

In reply to your letter of December 17 we areglad to inform you that the Smith Drum Monel hosiery dyeing machines installed at the time we constructed our new dye house in 1921, are still giving highly satisfactory service.

Yours very truly,
PHOENIX HOSIERY COMPANY
F. D. MacIver
Production Manager

F D MacIver
ET

We have loaned Uncle Sam some of our typewriters for the duration. Please excuse the brevity of this letter.

Twenty years... twenty-five years, and longer...of steady trouble-free service is not unusual for Monel textile equipment.

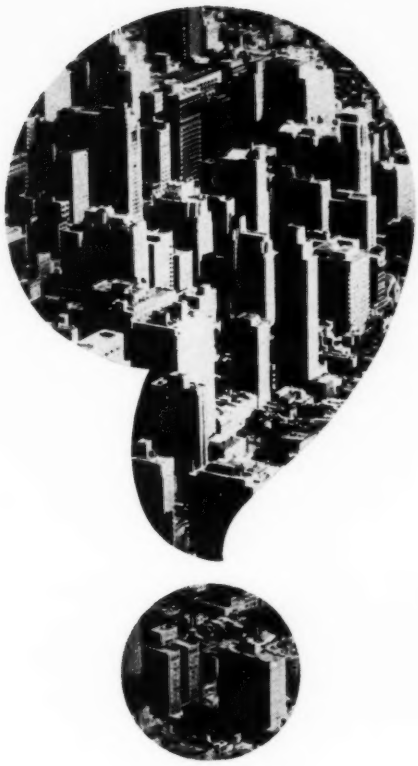
The letters reproduced here are but two of many affirming this fact.

The proved durability of Monel is especially important now, when repair parts are so difficult to get.

Down time is cut to a minimum; peak production schedules are maintained where Monel equipment is used.

Today, the entire output of this durable, corrosion-resistant metal is reserved for direct war uses. With peace, Monel will again be available for those who demand the best in textile equipment.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

Whose  Market?

THERE is no such thing as a market that favors either buyer or seller exclusively... it favors both or none.

When the buying end of business cannot get raw materials, manpower, containers, or whatever is necessary for the production of finished goods, the selling end cannot make shipments to customers on schedule.

It takes both buyers and sellers to make a business, and *teamwork* to make a success of it. So... let's not delude ourselves that these difficult times are a paradise for so-called "sellers." We are all confronted with identical problems and we will have to work them out together. *Together,* we can work them out best.

Note Our New Address!

NATIONAL STARCH PRODUCTS
INCORPORATED
270 MADISON AVENUE, NEW YORK 16, N. Y.
CHICAGO — PHILADELPHIA — BOSTON — INDIANAPOLIS — SAN FRANCISCO

IMPORTANT
ADVANCES IN

Water Repellent

TREATMENT OF

TEXTILES

TAM Zirconium Acetate, TAM Sodium Zirconium Acetate and TAM Zirconium Oxychloride are becoming highly important additions in the water repellent treatment of all types of textiles.

Results prove high repellence against hydrostatic and spray tests and good resistance to water washing. Tendering is practically eliminated and aging tests indicate prolonged water repellent life of your textiles.

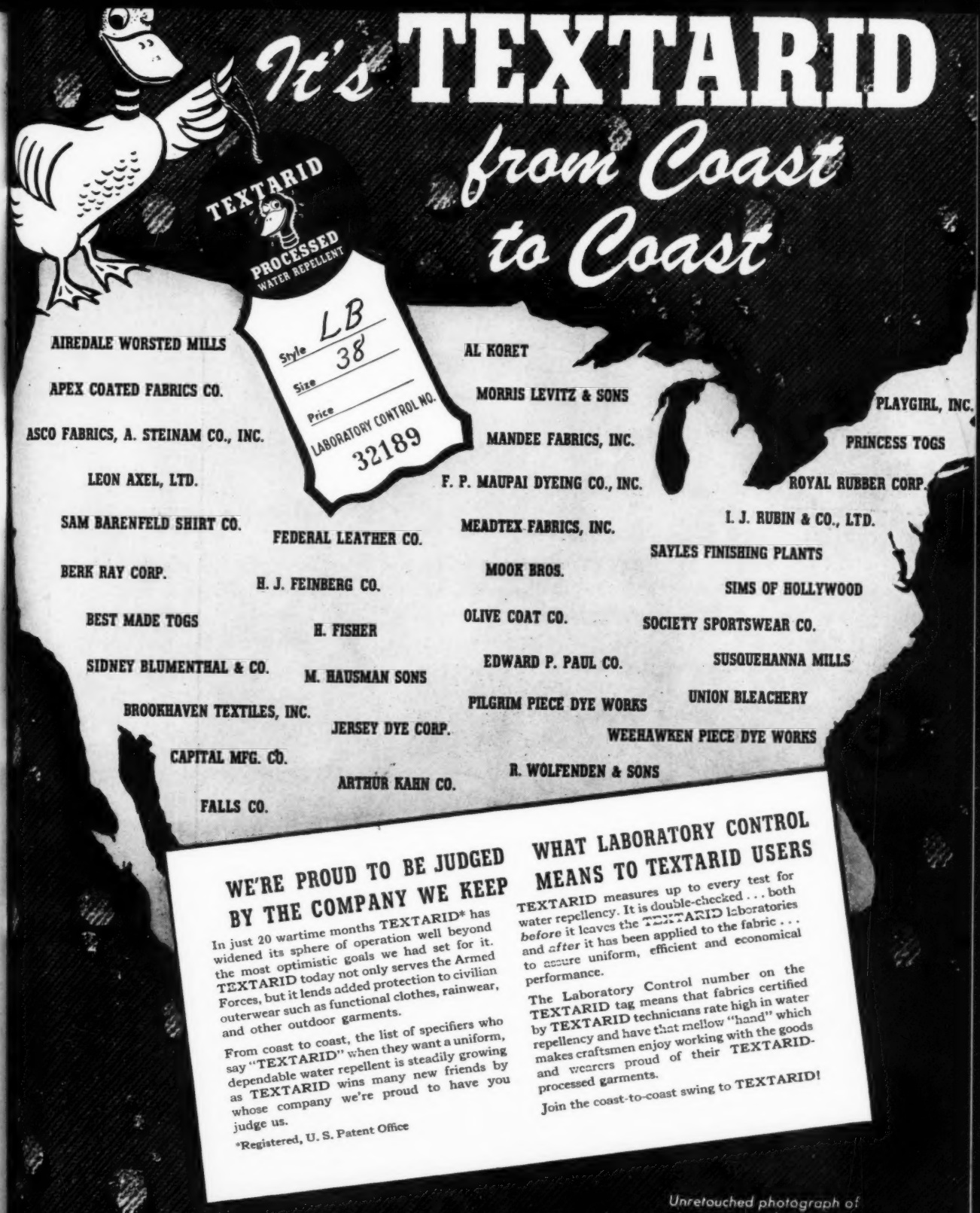
An interesting report describing six methods of treatment has been prepared. We will be glad to send it to interested textile chemists.

TITANIUM
ALLOY MANUFACTURING COMPANY

TAM
ZIRCONIUM & TITANIUM
PRODUCTS

GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast States . . . . L. M. BUTCHER COMPANY, Los Angeles, San Francisco, Portland, Seattle
Representatives for Europe . . . . IMPERIAL OXIDE & CHEMICAL CO., Ltd., Plantation House, Fenchurch St., London, E. C. 3, Eng.



WE'RE PROUD TO BE JUDGED BY THE COMPANY WE KEEP

In just 20 wartime months TEXTARID* has widened its sphere of operation well beyond the most optimistic goals we had set for it. TEXTARID today not only serves the Armed Forces, but it lends added protection to civilian outerwear such as functional clothes, rainwear, and other outdoor garments.

From coast to coast, the list of specifiers who say "TEXTARID" when they want a uniform, dependable water repellent is steadily growing as TEXTARID wins many new friends by whose company we're proud to have you judge us.

*Registered, U. S. Patent Office

WHAT LABORATORY CONTROL MEANS TO TEXTARID USERS

TEXTARID measures up to every test for water repellency. It is double-checked . . . both *before* it leaves the TEXTARID laboratories and *after* it has been applied to the fabric . . . to assure uniform, efficient and economical performance.

The Laboratory Control number on the TEXTARID tag means that fabrics certified by TEXTARID technicians rate high in water repellency and have that mellow "hand" which makes craftsmen enjoy working with the goods and wearers proud of their TEXTARID-processed garments.

Join the coast-to-coast swing to TEXTARID!

Unretouched photograph of TEXTARID-processed fabric

L. SONNEBORN SONS, INC., NEW YORK, N. Y.

Manufacturing Chemists and Oil Refiners for the Textile Industry

Plant and Laboratories: Nutley, N. J. Refineries: Petrolia and Franklin, Pa.

ALROSE

The House Founded by Research - Built by Manufacturing!

In the 15 years since its inception, the success of The Alro Line has been based on closely uniting the above factors.

A trained staff of research chemists, guided by the latest scientific discoveries, continue to devote their entire time to the creation of new synthetic chemicals . . . products that enable the textile industry to produce better fabrics at less cost.

Then, under the careful supervision of experienced technicians, these "products of research" are manufactured. To-day, aided by a larger and modern research laboratory, The Alro Line is continuing its impressive march forward.

Call on Alrose for assistance in solving your next textile finishing problem.

THE ALRO LINE

- Wetting Agents
- Rewetting Agents
- Synthetic Detergents
- Cation Softeners
- Waterproofing Compounds
- Mildewproofing Agents
- Flame Retardants
- Printing Gums
- Glycerine Substitutes
- Synthetic Waxes
- Emulsifiers for Oils and Waxes
- Kier Boiling Assistant (special)

CORNER OF STANDARDS CONTROL LABORATORY

ALROSE CHEMICAL CO.

MANUFACTURERS OF RESEARCH PRODUCTS • PROVIDENCE, RHODE ISLAND

ZINSSER & COMPANY, INC.

Manufacturing Chemists

Established 1897

Hastings-on-Hudson, N. Y.

Manufacturers of

ANILINE
ALIZARINE
CHROME and
ACETATE DYESTUFFS

— also —

FINE ORGANIC PIGMENTS
TANNIC ACID and CHEMICALS

Our staff of chemists and our fully equipped laboratories are always at the service of our customers for the solution of mill problems.

You Have A Choice When You Use

Ahcopel

OTHER

AHCO PRODUCTS

Ahcovel Substantive Softener

•

Ahcobinder-T

•

Ahcobond-S

•

Ahcowet-SM Wetting Out Agent

•

Resynon Finishing Compounds

•

Concental Softener

•

Sizing and Printing Gums

•

Heavy Chemicals

One formula does not fit all water repellent requirements any more than one suit of clothes fits all men. That's why we give you a CHOICE of formulas, when you use Ahcopel.

★

If desired, we make the emulsion mildew resistant, to Government specifications. The degree of water repellency can also be regulated to needs.

★

The wide adaptability and the efficiency of Ahcopel are due to our long experience in this field. Ahcopel was one of the first water repellents developed in this country.

MILITARY USES FOR AHCOPEL

Uniforms

Shelter Tents

Camouflages

Webbing

Sleeping Bags

Parachute Cords

ARNOLD-HOFFMAN & COMPANY, INC.

Established 1815 PROVIDENCE, RHODE ISLAND Plant at Dighton, Mass.

NEW YORK ★ BOSTON ★ PHILADELPHIA ★ CHARLOTTE

FOUR BANDO ALL-RAYON SHIRTINGS NOW CARRY THE "CROWN" TESTED GREEN TAG

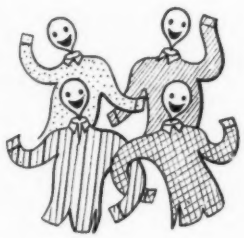
No. 16 of a series—from our files on the new "CROWN" Tested Plan

Just for a moment, put yourself in the place of Brand & Oppenheimer . . . one of the country's top converters.

Recently they were out to develop a whole family of all-rayon shirtings for men's and women's dress and sportswear . . in oxford, fuji, linen-type and gabardine-type weaves.

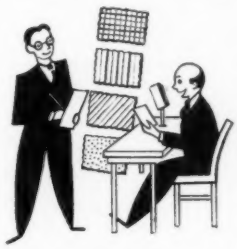
Now if you were Brand & Oppenheimer, you'd have very definite ideas about the qualities that rayon shirting fabrics should have. And that's where you might call in American Viscose Corporation to discuss CROWN Testing these shirtings.

Which is exactly what happened. In a three-way consultation with their finisher, North Carolina Fabrics Corporation, a procedure was outlined. First, proper dyestuffs were selected. A routing method was established to assure CROWN Tested's dimensional restorability of 1%. Then . . . we tested and re-tested samples of dye lots.



Now . . . thanks to the amazing new Vatru-Set process of vat dyeing, the finish of these all-rayon shirtings meets every test. Not only is there definite shrinkage control . . . but in each case the distinctive character of the cloth remains unchanged.

Brand & Oppenheimer call this new family of CROWN Tested shirtings Bando "Green Light" fabrics. In the market you'll find them under the registered names of Ox-Spun, Samba, Lin-Slub and Supergab. To be sold under the CROWN Tested Green (go-ahead-and-wash-it) Tag, here are some of the requirements every dye lot of these fabrics has had to meet:



Tensile Strength, Dry 50 lbs.
Laundering Temperature . . . 160° F.
Dimensional Restorability . . 1%
Resistance to Sunlight . . . 40 hrs. Fade-Ometer
Resistance to Perspiration . . acid and alkali

Here is another achievement for the CROWN Tested Plan! And it shows, once again, how this Plan can benefit you . . . if you work with rayon. Would you like us to prove it?

Post-War Planning with the CROWN Tested Plan

Yes, foresighted converters are looking ahead right now to the time when the best business will again go to the producer of the best fabrics. That's why you'll find more and more progressive converters using the CROWN Tested Plan.

And speaking of future planning, let us call your attention to American Viscose Corporation's fabric library. This collection is the result of many years of textile experience, and offers information on fabric development, construction and finishing. You are invited to consult our Fabric Development Department at any time.

NEW INFORMATIVE LABELING

Consumer Satisfaction under the Three Tag System

"Crown" Tested Rayon Fabric

Reg. U. S. Pat. Off.

CROWN TESTED RAYON FABRIC

This is a stabilized fabric. Tests predict it will not change visibly in color or in texture, nor in size more than 1% if instructions are followed. Samples of every dye lot of this fabric have been tested for stability and strength, according to minimum requirements set and maintained by

AMERICAN VISCOSE CORPORATION

Producer of CROWN *Rayon Yarns and Staple Fibers*

Sales Offices: 350 Fifth Avenue, N. Y. C. 1; Providence, R. I.; Charlotte, N. C.; Philadelphia, Pa.

Copr. 1943—American Viscose Corp.

QVALITY COLORS

TELEPHONE
HANcock 5740-5741-5742

Over Twenty nine years of uninterrupted dyestuff service.

UNITED STATES DYESTUFF CORPORATION

36 EXCHANGE PLACE
PROVIDENCE, R. I.

76 BATTERYMARCH STREET
BOSTON, MASS.

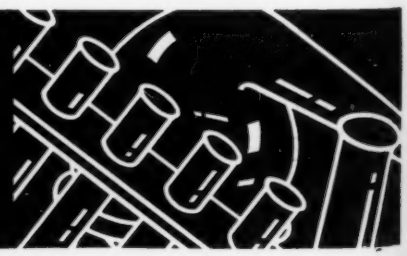
A & LIPPINCOTT STREETS
PHILADELPHIA, PA.

Specialists in Union Dyeing

BIXAMINE BROWN BRLL

- **Direct**
- **Homogeneous**
- **Level Dyeing**
- **Excellent light fastness**

BICK & CO., Inc.
Manufacturing Chemists
Reading, Pa. Charlotte, N. C.



TOPS
IN
QUALITY PERFORMANCE

WATSON-PARK CO.
Wapaco Leads
BOSTON, MASS.

MANUFACTURED
PRODUCTS
BY

WATSON-PARK COMPANY

PROVIDENCE, R. I. TEL: HOPKINS 3022 • TORONTO, CANADA. TEL: MELROSE 3807

Main Office:
261 Franklin Street
Boston, Mass.

New England Agents
for
Bates Chemical Co.
Certified Food Colors

Factory:
Ballardvale
Mass.

Sole Textile Distributors for
COWLES DETERGENT COMPANY, CLEVELAND, OHIO

PROTELA

MODIFIED PROTELA—Approved Class III—T-1452A

CUPROTELA—Approved Class II—T-1452A

REPEL "M"—Water repellent—mildewproofing combination meets Quartermaster requirements

REPEL "A"—Highly stabilized water repellent

Albi Chemical Corporation

9 PARK PLACE, NEW YORK

UCPC

ANILINE COLORS
SUMAC EXTRACT
NATURAL DYESTUFFS
INTERMEDIATES
SIZINGS and FINISHING MATERIALS

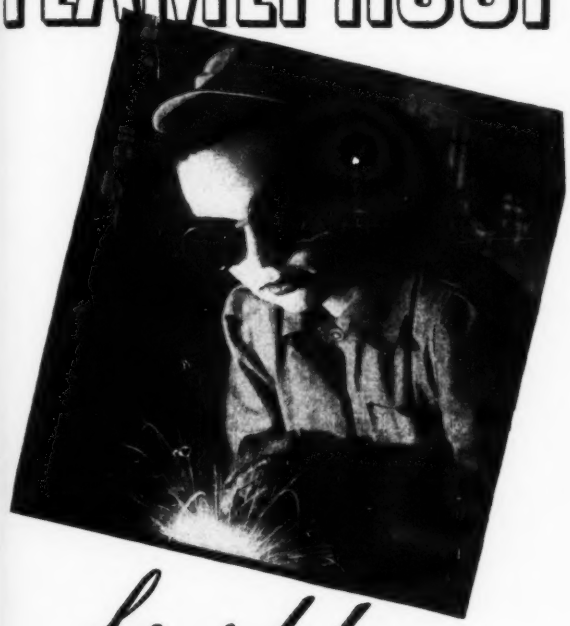
UNITED CHEMICAL PRODUCTS CORP.

Main Office and Works:
YORK AND COLGATE STREETS, JERSEY CITY, N. J.

INQUIRIES SOLICITED

Branches:
RALEIGH, N. C. PAWTUCKET, R. I. HAZELHURST, MISS.

FLAMEPROOF



finish!

How many yards of the fabric going through your plant today should be treated with a fire retardant? Will you be prepared to handle tomorrow's increased market for "flameproofed" fabrics?

War workers in ordnance plants and essential industries throughout the country are learning the advantages of "flameproofing." Protective garments, gloves, safety curtains and screens treated with Du Pont Fire Retardants are helping to reduce lost man hours and property damage.

When peace comes, thousands of these workers will return to their homes or different jobs. But they will retain their knowledge of fire retardant fabrics and will expect them in many peacetime garments and home furnishings.

Du Pont offers you a group of Fire Retardants. For instance, "CM" prevents spread of flame—fires caused by sparks and dangerous after glow. It will not stiffen fabrics or dust out on the surface. Other Du Pont Fire Retardants are "T," "3WG" and Ammonium Sulfamate.

Du Pont Fire Retardants can be used to "flameproof" all types of fabrics except acetate rayon. Write today for full details. Working samples are available. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

Keep on Buying War Bonds!

DU PONT

FIRE RETARDANTS

Better Things for Better Living . . . Through Chemistry

There's only ONE

GRAND CANYON OF THE COLORADO

The Grand Canyon of the Colorado is unparalleled throughout the world.

DIASTAFOR de-sizing agent is also unique and has been so recognized in the textile trade for 35 years.

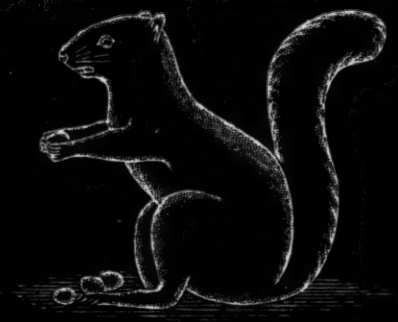
Chemists and mill-owners the country over have found that DIASTAFOR does a superb job on cottons, mixed goods and rayons, giving them a finish that's smooth, supple and flawless. Microscopic inspections of DIASTAFOR-finished goods show the perfection it achieves every time.

DIASTAFOR saves many costly mistakes—affords economy—assures correct results. It is thoroughly uniform and dependable. 35 years of complete satisfaction stand behind it. That's an unbeatable record!

For further information ask our technical man or write to —

FLEISCHMANN'S DIASTAFOR
DIASTAFOR DIVISION OF
Standard Brands Incorporated
40 Worth Street **New York 13, N. Y.**

DIASTAFOR
35 Years of Satisfactory Results



Foresight!

In anticipating what you may expect in dyehouse production of fast blacks, it is sound thinking to give preference to Logwood.

Your judgment would be based on its many outstanding advantages, which include unmatched lustre, perfect penetration, economy, 3% to 5% weight increase, speedy production, adaptability to all types of fabrics, etc.

Whether you put quality or economical production first, you will find that Logwood scores heavily on both points.

Send for our booklet:
"Advantages of Dyeing Wool with Logwood"

American Dyewood
COMPANY

22 EAST 40th STREET NEW YORK

BRANCHES:
BOSTON • PHILADELPHIA • CHICAGO

CANADIAN REPRESENTATIVES:
CANADA COLORS & CHEMICALS LTD. TORONTO
PRESCOTT & CO. Reg'd. MONTREAL

ANILINE DIVISION:
NEW YORK COLOR & CHEMICAL CO.
BELLEVILLE, N. J.

LOGWOOD
first choice for fast blacks

CONCO

Continental Chemical Co.
Passaic, N. J.

Announces . . .

PROTENOL K
a NEW

Detergent and dye assistant for all synthetic fibres,—cotton,—wool.

Extraordinary on Acetate

POWERFUL • EFFECTIVE

Fast to hard water and alkali.

Samples on request

FOR BEST RESULTS USE

Kali
PRODUCTS

They are tested and approved by leading textile mills.

Typical of a Full Line

Aquakal No. 73, for quick wetting out of ducks for mineral or vat dyeing, and rewetting for sanforizing. Used on piece goods, skeins and packages or raw stock.

Aquakal No. 74—for pasting vat dyes.

Hydroxy* Water-Shield, meets U. S. Government specifications, with or without approved mildewproof.

Hydroxy Mildewproof No. 2—Approved by U. S. Army Corps of Engineers to meet tentative specification T-1452A.

Hydroxy Sizes for filament or staple yarns, viscose, acetate or Bemberg.

Hydroxy Treatments for viscose or acetate knitting yarns.

Sulphonated Oils—for finishing, boil-off or scouring.

(*Reg. U. S. Pat. Off.)

Kali Manufacturing Company
Manufacturing Chemists

1410 No. Front St. Philadelphia 22, Pa.

Tomorrow's products...

in today's laboratories

Maybe you know already what PQ Quality means to uninterrupted production because your plant is now using a PQ Silicate. But if you have never worked with PQ and are today studying a product or process which might involve a soluble silicate, the present is a good time to get acquainted.

First, get fresh samples of silicate — samples of PQ uniform quality that are based on high standards scrupulously watched. Then tap our experience of over three-quarters of a century in producing silicates for industry. Specific advices where particular conditions are known.

SILICATES OF SODA

PHILADELPHIA QUARTZ CO.

Gen'l Off.: 125 S. Third St., Phila., Pa.
Chicago Sales Off.: 205 W. Wacker Dr.
9 Mfg. Plants • Distributors in 60 cities

PQ

REG. U.S. PAT. OFF.

SINGEING • DRYING • CURING

WITH

INFRA-RED RADIANT HEAT GENERATORS

Radiant Heat is now recognized by all leading engineers as a scientific tool of Industry . . . and CARBOMATIC equipment is your best guarantee of applying this tool *at peak efficiency, speed and economy* to all textile drying and finishing operations.

Especially Developed and Constructed For:

- **PALMERS**
- **TENTERS**
- **LOOP DRYERS**
- **SINGERS**
- **SLASHERS**
- **THREAD DRYERS**

AND OTHER TEXTILE EQUIPMENT

Controlled temperatures *plus* high turndown assure the *uniform drying* required by vat and synthetic resin dyes and polymerization of synthetic resin, anti-crush, waterproof and flameproof finishes.

CARBOMATIC equipment is completely automatic and adjustable . . . designed to meet all insurance requirements . . . readily attachable to present equipment.

- *Fully illustrated descriptive circular AD-12 on request.*

INFRA-RED Division

CARBOMATIC CORPORATION

Pioneers in Radiant Heat Burner Equipment, Gas or Electric

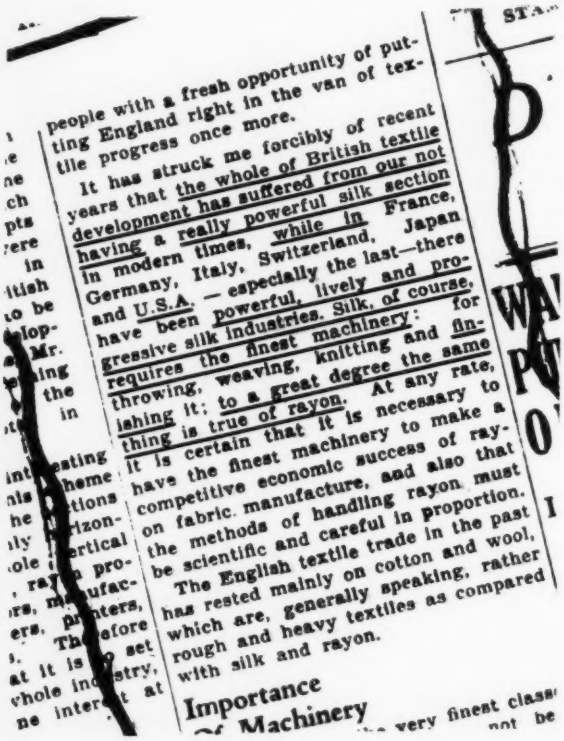
1775 Broadway, New York 19, N. Y.

Also H. W. Butterworth & Sons Co., Philadelphia, Pa.

In Canada: Canadian Textile Engineering Ltd., 980 St. Antoine St., Montreal, P. Q.

FINE MACHINES —for SILK then —for RAYON now

In an address before the General Meeting of the British Rayon Federation, a leading personality in the rayon industry is reported by *The Daily News Record* to have said as follows:



people with a fresh opportunity of putting England right in the van of textile progress once more.

It has struck me forcibly of recent years that the whole of British textile development has suffered from our not having a really powerful silk section in modern times, while in France, Germany, Italy, Switzerland, Japan and U.S.A. — especially the last—there have been powerful, lively and progressive silk industries. Silk, of course, requires the finest machinery: for throwing, weaving, knitting and finishing it; to a great degree the same thing is true of rayon. At any rate, it is certain that it is necessary to have the finest machinery to make a competitive economic success of rayon fabric manufacture, and also that the methods of handling rayon must be scientific and careful in proportion.

The English textile trade in the past has rested mainly on cotton and wool, which are, generally speaking, rather rough and heavy textiles as compared with silk and rayon.

Importance

For many years Van Vlaanderen was the largest seller of silk machines in this country.

Today Van Vlaanderen is the leading seller of rayon finishing machinery.

VAN VLAANDEREN MACHINE COMPANY

Paterson • New Jersey

•

THE

IMPOSSIBLE

- IS -

"THAT" - WHICH WE HAVE NOT YET TRIED TO DO

Try TITAN for products of proven quality and merit, and inquire about our *"TITAZOLE SCX"* the All-Purpose Scourer, Cleanser, Softener and Dyeing assistant. Excellent with soap for fulling.

"TITAN for Quality"

TITAN CHEMICAL PRODUCTS, INC.

Jersey City 6 New Jersey

YOUR ADVERTISING MESSAGE IN THIS ISSUE WILL BE READ BY MORE THAN 4800 CHEMISTS, DYERS AND FINISHERS. . . .

. . . and we suggest a regular advertising schedule in this, the official publication of the procedings of the

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

•

LOGWOOD BLACK

for

LEATHER · WOOL
SILK · COTTON
FUR · HAIR · PIGMENTS

DEPENDABLE SOURCE OF SUPPLY
ECONOMICAL · RELIABLE

Tannic Acid · Sumac · Quercitron
Fustic · Gambier · Flavine

THE J. S. YOUNG COMPANY
BALTIMORE, MD.

RAPIDASE

THE STANDARD DE-SIZING AGENT

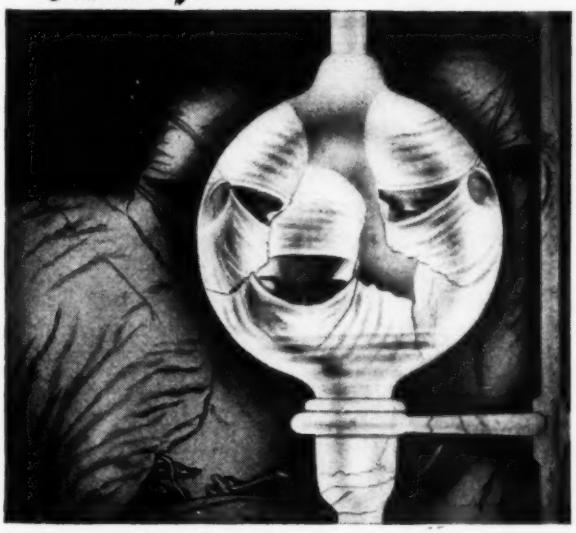
for cottons, rayons and mixed goods

For your de-sizing problems — our technical men are at your service . . . Write or 'phone.

WALLERSTEIN COMPANY, INC.
180 MADISON AVENUE, NEW YORK

SOLVAY*

...KEYED TO TODAY AND TOMORROW



Today . . . Solvay Alkalies are helping in the production of rubber life rafts, parachutes, medical kits and special food containers. These new devices are keeping casualties down, enabling fighting men to live and fly again! As new fighting fronts open, Solvay will continue to devote its facilities to the increasing needs of the armed forces!

Tomorrow . . . Solvay Alkalies, backed by over 60 years of experience and continuous research, will make their special contribution to the great new discoveries of medical science — safeguarding the health of a nation and its workers — and dedicated to the further advancement of industry! Look to Solvay for the highest quality alkalies!

SOLVAY

The Solvay Process Company employs salt, limestone and ammonia to make Soda Ash, from which basic material Caustic Soda and other alkalies are derived

SODA ASH
AMMONIUM BICARBONATE
AMMONIUM CHLORIDE
PARA-DICHLOROBENZENE
CAUSTIC POTASH

CHLORINE

CAUSTIC SODA
POTASSIUM CARBONATE
SODIUM NITRITE · SALT
CALCIUM CHLORIDE
MODIFIED SODAS

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 RECTOR STREET NEW YORK 6, N. Y.

A MESSAGE ON THE SUBJECT OF INTELLIGENT TEXTILE ADVERTISING

• Properly planned and understandingly directed, an advertising program can be of inestimable value to the individual company and today in particular, will contribute immeasurably to the promotion of confidence in the economic expansion of the Textile-Chemical Industry.

• Accordingly this message is directed to those advertising agencies and individual companies who are interested in *post-war recognition* and the most profitable allocation of moneys spent for textile advertising.

• Textile wet processing includes all chemical operations necessary in Scouring, Bleaching, Mercerizing, Dyeing, Printing, Waterproofing, Mothproofing and other types of Finishing of Cotton, Wool, Silk, and all Synthetic Fibers.

• It is a technical phase of textile manufacture *entirely distinct* from spinning, weaving and knitting.

• Consequently, the ideal medium for the advertising of products and apparatus used in wet processing operations is one which *reaches personally* the individual in charge of these operations.

• 1. A technical publication with subject matter solely of a character designed to be of value to all wet processing specialists.

• 2. A publication which eliminates waste circulation to spinners, weavers and knitters.

• 3. A publication with advertising rates in line with possible remuneration from sales.

• The reader interest of The American Dyestuff Reporter is proven by an average annual subscription renewal of 92.9%.

• The American Dyestuff Reporter carries more than *twice as much* advertising of dyestuffs and chemical products as any other "blanketing" publication. The general textile publication which covers all phases of textile manufacture cannot, by its very nature, possess this concentration of effectiveness for the advertising of wet-processing materials, machines and apparatus. Its circulation will, naturally, be much greater but a major portion of this circulation will be waste for the purposes of the advertiser. Nor can such a general publication, even in cases where it reaches the proper individual in the wet-processing department, be expected to arouse and hold his interest to anything like the extent that does one devoted solely to his particular problems.

• The Chemist, Dyer, Finisher, Bleach and Print Room Foremen are the key men to cultivate through advertising.

• They are essentially, *students of research.*

• They prove the worth of a product by laboratory test and actual plant performance. They instigate and approve, machinery purchases.

• They recognize that wet-processing is an important factor contributing to fabric sales and their experience includes a broad understanding of the importance of consumer acceptance.

• Advertising copy can, therefore, be broad in its appeal although specific technical information should be included.

• The American Association of Textile Chemists and Colorists, formed November 3rd, 1921, today constitutes one of the most important technical bodies in the Textile Industry.

• With 159 original members the Association today has over 3,000 active, junior, associate, student and corporate members.

• Active Membership requires at least five years experience in Textile wet-processing operations. Members are therefore men of consequence.

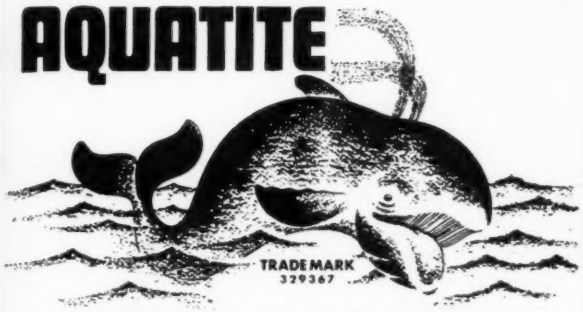
• There are eight active local sections, located in textile centers throughout the country, and three student sections. Each holds frequent meetings at which technical papers are presented and discussed. Full reports of these meetings appear *solely* in American Dyestuff Reporter.

• Technical papers prepared for presentation before a *scientific society* are far more authoritative than ordinary contributed articles. The medium which publishes them is, therefore, read most carefully by outsiders as well as by members of the Association.

• During the months ahead intelligent advertising, consistent advertising, honest well directed advertising, will play a big part in post-war sales expansion.

M. D. R.

AQUATITE



A Whale of a Finish

AQUATITE, A

A one bath water repellent finish for hosiery, cotton duck, rayons, satins, etc., which meets exacting Government specifications as well as all civilian standards.

•

We suggest that you write immediately for complete information.

•

ALCO OIL & CHEMICAL CORP.

Executive Office

Trenton Ave. and William Street, Philadelphia, Pa.

INTEGRITY

The integrity and saleability of the textile product you send to market, are in no small way dependent upon the integrity of the oils and compounds you use for processing and finishing. The integrity of Zurnoil products has been proved by over 60 years of use for the efficient scouring, stripping, penetrating and finishing of every kind of fibre. Constant research, laboratory control of production and efficient manufacture maintain the integrity of Zurnoil products for today's ever changing fibre requirements. Your inquiries are solicited.

Zurnoil
TEXTILE CHEMICALS

SCOUR "A"
Eliminates the use of soap
PENT LEV S. B.
Superior Penetrating Leveler
ALCOPHATE
(powder or paste)
Efficient Wetting Out, Penetraing and Leveling Agent

O. F. ZURN COMPANY
PHILADELPHIA 32, PA

KNOXVILLE, TENN. · HAMILTON, ONT., CANADA

TEXTILES' VITAL ROLE IN WINNING THE WAR
(No. 9 OF A SERIES)

"SHOULDER ARMS"

For the Textile Chemist and Dyer

WESTINGHOUSE PHOTO

Far from the field of battle . . . armed only with the equipment of the laboratory and his own trained faculties, the Textile Chemist and Dyer nevertheless plays a dynamic role in winning the war. The men in the armed forces have reason to be grateful to him for their comfort . . . for the protection of their equipment . . . often for their lives.

Textile mills count on Burk-Schier Wet Processing Agents for help in processing all sorts of fabrics. Different characteristics are needed to suit varying military and civilian fabrics . . . new problems must be tackled every day. It's a big job . . . but the Textile Chemists and Dyers are successfully making fabrics fit to fight, here at home, as well as at the front.

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO.

Manufacturing Chemists for the Textile Industry

CHATTANOOGA, TENNESSEE

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

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BURK-SCHIER *Wet Processing Agents*

For Every Textile Application

BURKART-SCHIER CHEMICAL CO., Chattanooga, Tenn.

MANUFACTURING CHEMISTS FOR THE TEXTILE INDUSTRY

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

The Jacket That Went To Sea

Life jackets to help protect the wearer's life in the water as well as from fire hazards, are now standard equipment for U.S. Navy men at sea.

These flame-repellent, water-resistant garments are made of plastic-impregnated fabric. Their design was based on combat reports.

The bulk and size of the jacket also gives protection against flying splinters during battle action. Specially kapok stuffed collars hold the head of an unconscious man out of water.

The Textile Industry is helping to protect our boys all over the world . . . supplying equipment that will stand up under any test.

***64%**

of equipment now in use in the wet end of textile finishing cannot operate at a profit in competition with modern machines.

*Proved by Research

Butterworth Machines are working day and night in the Wet End of Textile Finishing—bleaching, boiling-out, drying, calendering, dyeing

The cooperation of Butterworth Engineers is freely offered to mills seeking to achieve increased productive efficiency . . . or to repair or replace worn-out or obsolete equipment.

All of our facilities not required for Ordnance production are available to help you solve your present finishing problems, and aid you in your post war plans. Let us serve you now

H. W. BUTTERWORTH & SONS CO.
Phila. 25, Pa. Serving Textile Industry since 1820
Offices in Providence, R. I. and Charlotte, N.C.
In Canada: W. J. Westaway Co., Hamilton, Ont.

Butterworth

PRODUCING GUN MOUNTS FOR THE UNITED STATES ARMY

...the eyes are on DuraBeau finishes

Reg. U. S. A. and Canada

. . . and, they have been for many years . . . not only the eyes of the wearer and admirer, but of the manufacturer, jobber and retailer as well, because *DuraBeau Finishes* offer *all* that is so essential in milady's hosiery: Dull Softness, Sheerness, Spot and Water Repellency, Elasticity, Snug Fitting, Long Wear and Enduring Beauty . . There is a DuraBeau Finish for every Fibre.

SCHOLLER BROS., INC., Mfrs. of Textile Soaps, Softeners, Oils, Finishes • Collins & Westmoreland Sts., Phila. 34, Pa. • St. Catharines, Ont., Can.

IN THE LONG RUN—

IT'S VATROLITE*

Whether you use Vatrolite on Army and Navy clothing — complete from underwear to outerwear — or in regular vat dye and color reduction for civilian outlets, you can count on 4 essential factors:

1 LONGER — LARGER RUNS

Vatrolite's full strength and unfailing uniformity makes this possible.

2 LESS DUSTING

Vatrolite's *granular uniformity* keeps dusting to a minimum. Also, its chemical structure assures less free SO_2. All this means better working conditions for your men — less sneezing and coughing, less absenteeism.

3 EXACTING RESULTS

Vatrolite's *high stability* (the result of strict laboratory control) has been attested and approved by practical application in leading plants throughout the country. It assures long-lasting quality.

4 ECONOMY

Vatrolite is clear white. Its high uniformity and stability result in longer runs — therefore real economy. Leading mills in many industries are discovering this in ever increasing numbers.

Write today for details on Vatrolite.

*Sodium Hydrosulphite Concentrated

ROYCE CHEMICAL COMPANY

CARLTON HILL, NEW JERSEY

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